2013 ESH/ESC Guidelines for the management of arterial hypertension

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2013 ESH/ESC Guidelines for the management of arterial hypertension

Treatment strategies

Lifestyle changes

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Treatment strategies
Lifestyle changes

- Appropriate lifestyle changes are the cornerstone for the prevention of hypertension and are also important for its treatment.
- They may safely and effectively delay or prevent hypertension in non-hypertensive subjects, delay or prevent medical therapy in grade I hypertension and contribute to BP reduction in hypertensive individuals already on antihypertensive drug therapy.
- Beside the BP-lowering effect, they contribute to the control of other CV risk factors and clinical conditions.
- The major drawback is the low level of adherence over time, which requires special action to be overcome.

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Recommendations on lifestyle changes

Are recommended	Class	LoE[a]	LoE[b]
Salt restriction to 5-6 g per day.	I	A	B
Moderation of alcohol consumption to no more than 20-30 g of ethanol per day in men and 10-20 g of ethanol per day in women.	I	A	B
Increased consumption of vegetables, fruits, and low-fat dairy products.	I	A	B
Reduction of weight to BMI of 25 kg/m^2 and of waist circumference to <102 cm in men and <88 cm in women, unless contraindicated.	I	A	B
Regular exercise, i.e. at least 30 min of moderate dynamic exercise on 5 to 7 days per week.	I	A	B
Advice to quit smoking and to offer assistance to all smokers.	I	A	B

[a] LoE: based on the effect on BP and/or CV risk profile
[b] LoE: based on outcome studies

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Treatment strategies

Initiation of antihypertensive drug treatment

'The initiation of antihypertensive drug treatment is based on the initial level of total cardiovascular risk'

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Initiation of lifestyle changes and antihypertensive drug treatment based on total CV risk

Other risk factors (RF), asymptomatic organ damage (OD) or disease	Blood Pressure (mmHg)			
	High normal SBP 130-139 or DBP 85-89	Grade 1 HT SBP 140-159 or DBP 90-99	Grade 2 HT SBP 160-179 or DBP 100-109	Grade 3 HT SBP ≥180 or DBP ≥110
No other RF	• No BP intervention	• Lifestyle changes for several months • Then add BP drugs targeting <140/90	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
1-2 RF	• Lifestyle changes • No BP intervention	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
≥3 RF	• Lifestyle changes • No BP intervention	• Lifestyle changes for several weeks Then add BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
OD, CKD stage 3 or diabetes	• Lifestyle changes • No BP intervention	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
Symptomatic CVD, CKD stage ≥4 or diabetes with OD/RFs	• Lifestyle changes • No BP intervention	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90

(In patients with diabetes, the optimal diastolic BP target is 80-85 mmHg)

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General recommendations on initiation of antihypertensive drug treatment*

Recommendations	Class	Level
Prompt initiation of drug treatment is recommended in individuals with grade 2 and 3 hypertension with any level of CV risk, a few weeks after or simultaneously with initiation of lifestyle changes.	I	A
Lowering BP with drugs is also recommended when total CV risk is high because of organ damage, diabetes, CVD or CKD, even when hypertension is in the grade 1 range.	I	B
Initiation of antihypertensive drug treatment should also be considered in grade 1 hypertensive patients at low to moderate risk, when BP is within this range at several repeated visits or elevated by ambulatory BP criteria, and remains within this range despite a reasonable period of time with lifestyle measures.	IIa	B
Unless the necessary evidence is obtained it is not recommended to initiate antihypertensive drug therapy at high normal BP.	III	A

*See dedicated section for recommendations in special conditions and populations.

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Treatment strategies

Blood pressure goals

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Blood pressure goals in hypertensive patients*

Recommendations	Class	Level
A systolic BP goal of <140 mmHg:		
a) is recommended in patients at low-moderate CV risk,	I	B
b) is recommended in patients with diabetes,	I	A
c) should be considered in patients with previous stroke or TIA,	IIa	B
d) should be considered in patients with coronary heart disease,	IIa	B
e) should be considered in patients with diabetic or non-diabetic chronic kidney disease.	IIa	B
A diastolic BP target of <90 mmHg is always recommended, except in patients with diabetes, in whom values <85 mmHg are recommended. It should nevertheless be considered that DBP values between 80 and 85 mmHg are safe and well tolerated.	I	A

*See dedicated section for recommendations in special conditions and populations

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Treatment strategies

- Choice of drugs
- Monotherapy vs combination therapy

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Recommendations on treatment strategies and choice of drugs (1)

Recommendations	Class	Level
Diuretics (thiazides, chlorthalidone and indapamide), beta-blockers, calcium antagonists, ACE inhibitors, and angiotensin receptor blockers are all suitable and recommended for the initiation and maintenance of antihypertensive treatment, either as monotherapy or in some combination with each other.	I	A
Some agents should be considered as the preferential choice in specific conditions because used in trials in those conditions or because of greater effectiveness in specific types of organ damage.	IIa	C

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Drugs to be preferred in specific conditions (a)

Asymptomatic organ damage	
Left ventricular hypertrophy	ACE inhibitor, calcium antagonist, ARB
Asymptomatic atherosclerosis	Calcium antagonist, ACE inhibitor
Microalbuminuria	ACE inhibitor, ARB
Renal dysfunction	ACE inhibitor, ARB

Clinical event	
Previous stroke	Any agent effectively lowering BP
Previous myocardial infarction	BB, ACE inhibitor, ARB
Angina pectoris	BB, calcium antagonist
Heart failure	Diuretic, BB, ACE inhibitor, ARB, mineralocorticoid receptor antagonist
Aortic aneurysm	BB
Atrial fibrillation, prevention	Consider ARB, ACE inhibitor, BB
Atrial fibrillation, rate control	BB, non-dihydropiridine calcium antagonist
ESRD/proteinuria	ACE inhibitor, ARB
Peripheral artery disease	ACE inhibitor, calcium antagonist

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Drugs to be preferred in specific conditions (b)

Condition	
Isolated systolic hypertension (elderly)	Diuretic, calcium antagonist
Metabolic syndrome	ACE inhibitor, ARB, calcium antagonist
Diabetes mellitus	ACE inhibitor, ARB
Pregnancy	Methyldopa, BB, calcium antagonist
Blacks	Diuretic, calcium antagonist

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Compelling and possible contra-indications to the use of antihypertensive drugs

Drug	Compelling	Possible
Thiazide diuretics	Gout	Metabolic syndrome, Glucose intolerance, Pregnancy, Hypercalcaemia, Hypokalaemia
Beta-blockers	Asthma A-V block (grade 2 or 3)	Metabolic syndrome, Glucose intolerance, Athletes and physically active patients, Chronic obstructive pulmonary disease (except for vasodilator beta-blockers)
Calcium antagonists (dihydropiridines)		Tachyarrhythmias, Heart failure
Calcium antagonists (verapamil, diltiazem)	A-V block (grade 2 or 3) Severe LV dysfunction Heart failure	
ACE inhibitors	Pregnancy Angioneurotic oedema Hyperkalaemia Bilateral renal artery stenosis	Women with childbearing potential
Angiotensin receptor blockers	Pregnancy, Hyperkalaemia Bilateral renal artery stenosis	Women with child bearing potential
Mineralocorticoid receptor antagonists	Acute or severe renal failure (eGFR <30 mL/min) Hyperkalaemia	

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Recommendations on treatment strategies and choice of drugs (2)

Recommendations	Class	Level
Initiation of antihypertensive therapy with a two-drug combination may be considered in patients with markedly high baseline BP or at high CV risk.	IIb	C
The combination of two antagonists of the renin-angiotensin system is not recommended and should be discouraged.	III	A
Other drug combinations should be considered and probably are beneficial in proportion to the extent of BP reduction. However, combinations that have been successfully used in trials may be preferable.	IIa	C
Combinations of two antihypertensive drugs at fixed doses in a single tablet may be recommended and favoured, because reducing the number of daily pills improves adherence, which is low in patients with hypertension.	IIb	B

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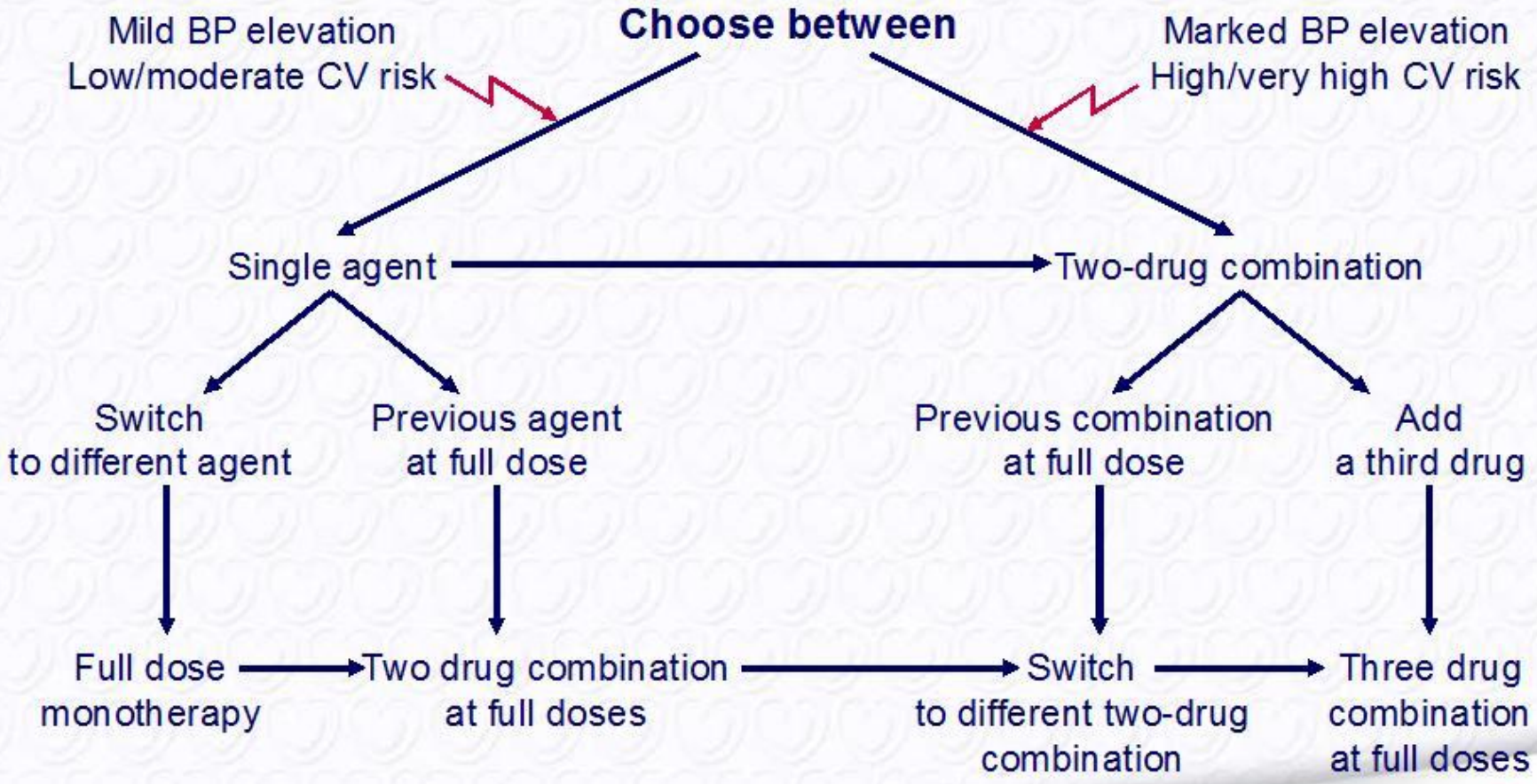
Monotherapy vs drug combination therapy
Moving from a less intense to a more intense therapeutic strategy to achieve target blood pressure



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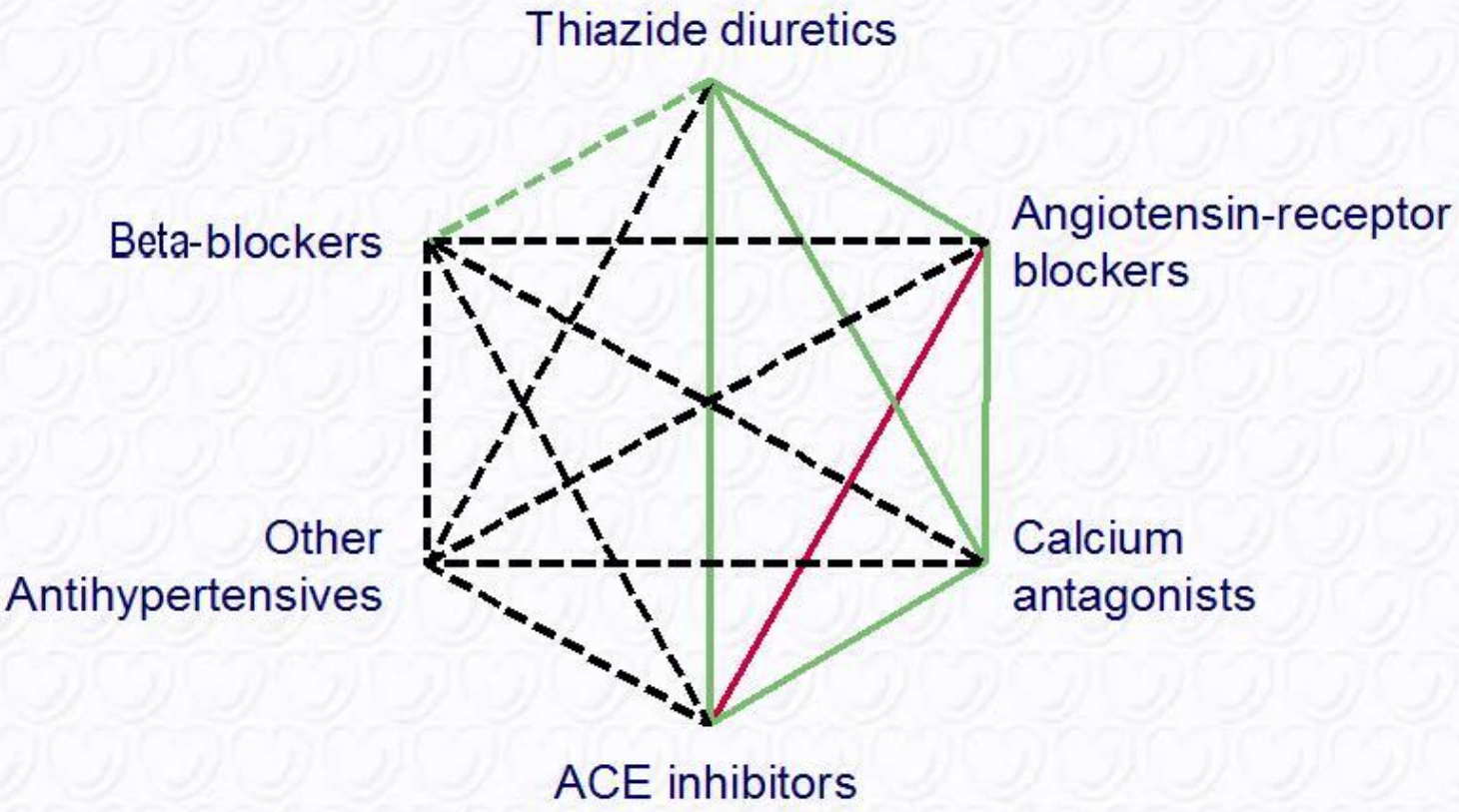
Possible combinations of classes of antihypertensive drugs



Green continuous lines: preferred. **Green dashed lines**: useful combinations with some limitations

Black dashed line: possible combinations (only DHP calcium antagonists should normally be combined with beta-blockers)

Red continuous line: not recommended combination

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White-coat and masked hypertension

Recommendations	Class	Level
In white-coat hypertensives without additional risk factors, therapeutic intervention should be considered to be limited to lifestyle changes only, but this decision should be accompanied by a close follow-up.	IIa	C
In white-coat hypertension with a higher CV risk because of metabolic derangements or asymptomatic organ damage, drug treatment may be considered in addition to lifestyle changes.	IIb	C
In masked hypertension, both lifestyle measures and antihypertensive drug treatment should be considered, because this type of hypertension has been consistently found to have a CV risk very close to that of sustained hypertension.	IIa	C

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Young adults

Recommendations	Class	Level
Despite absence of evidence from randomized controlled trials, antihypertensive drug treatment may be considered prudent in young hypertensives and, especially when other risk factors are present.	-	-
Young individuals with white-coat hypertension can be followed with lifestyle measures only.	-	-
Lack of evidence does also not allow recommending to initiate antihypertensive drug therapy in young individuals with isolated elevation of brachial SBP, but these individuals should be followed closely with lifestyle recommendations.	III	A

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Elderly

Recommendations	Class	Level
In elderly hypertensives with SBP ≥160 mmHg there is solid evidence to recommend reducing SBP to between 150 and 140 mmHg.	I	A
In fit elderly patients <80 years old antihypertensive treatment may be considered at SBP values ≥140 mmHg with a target SBP <140 mmHg if treatment is well tolerated.	IIb	C
In individuals older than 80 years with an initial SBP ≥160 mmHg it is recommended to reduce SBP to between 150 and 140 mmHg, provided they are in good physical and mental conditions.	I	B
In frail elderly patients, it is recommended to leave decisions on anti-hypertensive therapy to the treating physician, and based on monitoring of the clinical effects of treatment.	I	C
Continuation of well-tolerated antihypertensive treatment should be considered when a treated individual becomes octogenarian.	IIa	C
All hypertensive agents are recommended and can be used in the elderly, although diuretics and calcium antagonists may be preferred in isolated systolic hypertension.	I	A

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Women

Recommendations	Class	Level
Drug treatment of severe hypertension in pregnancy (SBP >160 mmHg or DBP >110 mmHg) is recommended.	I	C
Drug treatment may also be considered in pregnant women with persistent elevation of BP ≥150/95 mmHg, and in those with BP ≥140/90 mmHg in the presence of gestational hypertension, subclinical organ damage or symptoms.	IIb	C
In women at high risk of pre-eclampsia, provided they are at low risk of gastrointestinal haemorrhage, treatment with low dose aspirin from 12 weeks until delivery may be considered.	IIb	B
Hormone therapy and selective oestrogen receptor modulators are not recommended and should not be used for primary or secondary prevention of CVD. If treatment of younger perimenopausal women is considered for severe menopausal symptoms, the benefits should be weighed against potential risks.	III	A
In women with child-bearing potential renin-angiotensin system blockers are not recommended and should be avoided.	III	C
Methyldopa, labetalol and nifedipine should be considered preferential antihypertensive drugs in pregnancy. Intravenous labetalol or infusion of nitroprusside should be considered in case of emergency (pre-eclampsia).	IIa	B

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Metabolic syndrome

Recommendations	Class	Level
Lifestyle changes, particularly weight loss and physical exercise, are to be recommended to all individuals with the metabolic syndrome. These interventions improve not only BP, but also the metabolic components of the syndrome, and delay diabetes onset.	I	B
As the metabolic syndrome can be considered a 'pre-diabetic' state, antihypertensive agents potentially improving or at least not worsening insulin sensitivity, such as blockers of the renin-angiotensin system and calcium antagonists, should be considered as the preferred drugs. Beta-blockers (with the exception of vasodilating beta-blockers) and diuretics should be considered only as additional drugs, preferably in association with a potassium-sparing agent.	IIa	C
It is recommended to prescribe antihypertensive drugs with particular care in hypertensive patients with metabolic disturbances when BP is ≥140/90 mmHg after a suitable period of lifestyle changes, and to maintain BP <140/90 mmHg.	I	B
BP lowering drugs are not recommended in individuals with metabolic syndrome and high normal BP.	III	A

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Diabetes mellitus

Recommendations	Class	Level
While initiation of antihypertensive drug treatment in diabetic patients whose SBP is ≥160 mmHg is mandatory, it is strongly recommended to start drug treatment also when SBP is ≥140 mmHg.	I	A
A SBP goal <140 mmHg is recommended in patients with diabetes.	I	A
The DBP target in patients with diabetes is recommended to be <85 mmHg.	I	A
All classes of antihypertensive agents are recommended and can be used in patients with diabetes; blockers of the renin-angiotensin system may be preferred, especially in the presence of proteinuria or microalbuminuria.	I	A
It is recommended that individual drug choice takes comorbidities into account.	I	C
Simultaneous administration of two blockers of the renin-angiotensin system is not recommended and should be avoided in patients with diabetes.	III	B

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Heart disease

Recommendations	Class	Level
In hypertensive patients with CHD, a SBP goal <140 mmHg should be considered.	IIa	B
In hypertensive patients with a recent myocardial infarction beta-blockers are recommended. In case of other CHD all antihypertensive agents can be used, but beta-blockers and calcium antagonists are to be preferred, for symptomatic reasons (angina).	I	A
Diuretics, beta-blockers, ACE inhibitors, angiotensin receptor blockers, and/or mineralocorticoid receptor antagonists are recommended in patients with heart failure or severe LV dysfunction to reduce mortality and hospitalization.	I	A
In patients with heart failure and preserved EF, there is no evidence that antihypertensive therapy per se or any particular drug, is beneficial. However, in these patients, as well as in patients with hypertension and systolic dysfunction, lowering SBP to around 140 mmHg should be considered. Treatment guided by relief of symptoms (congestion with diuretics, high heart rate with beta-blockers, etc.) should also be considered.	IIa	C
ACE inhibitors and angiotensin receptor blockers (and beta-blockers and mineralocorticoid receptor antagonists if heart failure coexists) should be considered as antihypertensive agents in patients at risk of new or recurrent atrial fibrillation.	IIa	C
It is recommended that all patients with LVH receive antihypertensive agents.	I	B
In patients with LVH, initiation of treatment with one of the agents that have shown a greater ability to regress LVH should be considered, i.e. ACE inhibitors, angiotensin receptor blockers and calcium antagonists.	IIa	B

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Cerebrovascular disease

Recommendations	Class	Level
It is not recommended to intervene with BP-lowering therapy during the first week after acute stroke irrespective of BP level, although clinical judgement should be used in the face of very high SBP values.	III	B
Antihypertensive treatment is recommended in hypertensive patients with a history of stroke or TIA, even when initial SBP is in the 140-159 mmHg range.	I	B
In hypertensive patients with a history of stroke or TIA, a SBP goal of <140 mmHg should be considered.	IIa	B
In elderly hypertensives with stroke or TIA, SBP values for intervention and goal may be considered to be somewhat higher.	IIb	B
All drug regimens are recommended for stroke prevention, provided that BP is effectively reduced.	I	A

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Atherosclerosis, arteriosclerosis and peripheral artery disease

Recommendations	Class	Level
In the presence of carotid atherosclerosis, prescription of calcium antagonists and ACE inhibitors should be considered as these agents have shown a greater efficacy in delaying atherosclerosis progression than diuretics and beta-blockers.	IIa	B
In hypertensive patients with a pulse wave velocity above 10 m/s all antihypertensive drugs should be considered provided that a BP reduction to <140/90 mmHg is consistently achieved.	IIa	B
Antihypertensive therapy is recommended in hypertensive patients with peripheral artery disease to achieve a goal of <140/90 mmHg, because of their high risk of myocardial infarction, stroke, heart failure, and CV death.	I	A
Though a careful follow-up is necessary, beta-blockers may be considered for the treatment of arterial hypertension in patients with peripheral artery disease, since their use does not appear to be associated with exacerbation of symptoms.	IIb	A

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Nephropathy

Recommendations	Class	Level
Lowering SBP to <140 mmHg should be considered.	IIa	B
When overt proteinuria is present, SBP values <130 mmHg may be considered, provided that changes in eGFR are monitored.	IIb	B
Blockers of the renin-angiotensin system are more effective in reducing albuminuria than other antihypertensive agents, and are indicated in hypertensive patients in the presence of microalbuminuria or overt proteinuria.	I	A
Reaching BP goals usually requires combination therapy, and it is recommended to combine blockers of the renin-angiotensin system with other antihypertensive agents.	I	A
Combination of two blockers of the renin-angiotensin system, though potentially more effective in reducing proteinuria, is not recommended.	III	A
Aldosterone antagonists cannot be recommended in CKD, especially in combination with a blocker of the renin-angiotensin system, because of the risk of excessive reduction in renal function and of hyperkalaemia.	III	C

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Resistant hypertension

Recommendations	Class	Level
In resistant hypertensive patients it is recommended that physicians check whether the drugs included in the existing multiple drug regimen have any BP lowering effect, and withdraw them if their effect is absent or minimal.	I	C
Mineralocorticoid receptor antagonists, amiloride, and the alpha-1-blocker doxazosin should be considered, if no contraindication exists.	IIa	B
In case of ineffectiveness of drug treatment invasive procedures such as renal denervation and baroreceptor stimulation may be considered.	IIb	C
Until more evidence is available on the long-term efficacy and safety of renal denervation and baroreceptor stimulation, it is recommended that these procedures remain in the hands of experienced operators and diagnosis and follow-up restricted to hypertension centers.	I	C
It is recommended that the invasive approaches are considered only for truly resistant hypertensive patients, with clinic values ≥160 mmHg SBP or ≥110 mmHg DBP and with BP elevation confirmed by ambulatory BP monitoring.	I	C

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Renovascular hypertension

- Renovascular artery stenosis secondary to atherosclerosis is relatively frequent, especially in the elderly population.
- It is still debated whether these patients benefit from intervention, mostly percutaneous renal artery stenting.
- Intervention is not recommended if renal function has remained stable over the past 6-12 months and if hypertension is controlled by an acceptable medical regimen (Class III, LoE B).
- Fibromuscular dysplasia is more common in younger mostly female patients with uncontrolled hypertension, in whom there is convincing though uncontrolled information favouring the intervention (Class IIa, LoE B).

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Obstructive sleep apnoea

- The association between obstructive sleep apnoea (OSA) and hypertension is well documented, particularly when nocturnal hypertension is concerned.
- Because of the relationship between obesity and OSA, weight loss and exercise are commonly recommended.
- Continuous positive airway pressure therapy is a successful procedure for reducing OSA, but the effect on BP appears to be very small.

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Malignant hypertension

- Malignant hypertension is a hypertensive emergency, clinically defined as the presence of very high BP associated with ischaemic organ damage (retina, kidney, heart or brain).
- Treatment is founded on agents that can be administered by intravenous infusion and titrated.

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Treatment strategies

Treatment of risk factors associated with hypertension

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Recommendations of treatment of risk factors associated with hypertension

Recommendations	Class	Level
It is recommended to use statin therapy in hypertensive patients at moderate to high CV risk, targeting a low-density lipoprotein cholesterol value <3.0 mmol/L (115 mg/dL).	I	A
When overt coronary heart disease is present, it is recommended to administer statin therapy to achieve low-density lipoprotein cholesterol levels <1.8 mmol/L (70 mg/dL).	I	A
Antiplatelet therapy, in particular low-dose aspirin, is recommended in hypertensive patients with previous CV events.	I	A
Aspirin should also be considered in hypertensive patients with reduced renal function or a high CV risk, provided that BP is well controlled.	IIa	B
Aspirin is not recommended for CV prevention in low-moderate risk hypertensive patients, in whom absolute benefit and harm are equivalent.	III	A
In hypertensive patients with diabetes, a HbA_{1c} target of <7.0% is recommended with antidiabetic treatment.	I	B
In more fragile elderly patients with a longer diabetes duration, more comorbidities and at high risk, treatment to a HbA_{1c} target of <7.5-8.0% should be considered.	IIa	C

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Follow-up and improvement of blood pressure control

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Follow-up and improvement of blood pressure control

- Individuals with high normal BP or white-coat hypertension, even if untreated, should be scheduled for regular follow-up, at least annually, to measure office and out-of-office BP, to check the CV risk profile and to reinforce recommendations on lifestyle changes.
- After initiation of antihypertensive drug therapy in patients with hypertension, the patient should be seen at 2- to 4-week intervals to evaluate the effects on BP and to assess possible side-effects.
- Once the target BP is reached, a visit interval of a few months is reasonable.
- Depending on the local organization of health resources, many of the later visits may be performed by non-physician health care workers, such as nurses.

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Follow-up and improvement of blood pressure control

- For stable patients, home BP monitoring and electronic communication with the physician may also provide an acceptable alternative.
- It is advisable to assess risk factors and asymptomatic organ damage at least every 2 years.
- The finding of an uncontrolled BP should always lead to a search for the cause(s), such as poor adherence, persistent white-coat effect or use of BP-raising substances. Appropriate actions should be taken for better BP control, avoiding physician inertia.

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2013 ESH/ESC Guidelines for the management of arterial hypertension

Gaps in evidence and need for future trials

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Gaps in evidence and need for future trials (1)

- Should antihypertensive drug treatment be given to all patients with grade 1 hypertension when their CV risk is low-to-moderate?
- Should elderly patients with a SBP between 140 and 160 mmHg be given antihypertensive drug treatments?
- Should drug treatment be given to subjects with white-coat hypertension? Can this condition be differentiated into patients needing or not needing treatment?
- Should antihypertensive drug treatment be started in the high normal BP range and, if so, in which patients?
- What are the optimal office BP values (i.e. the most protective and safe) for patients to achieve by treatment in different demographic and clinical conditions?
- Do treatment strategies based on control of out-of-office BP provide an advantage (reduced clinical morbidity and mortality, fewer drugs, fewer side-effects) over strategies based on conventional (office) BP control?

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Gaps in evidence and need for future trials (2)

- What are the optimal out-of-office (home and ambulatory) BP values to be reached with treatment and should targets be lower or higher in high risk hypertensives?
- Does central BP add to CV event prediction in untreated and treated hypertensive patients?
- Do invasive procedures for treatment of resistant hypertension compare favourably with the best drug treatment and provide long-term BP control and reduction of morbid and fatal events?
- Do treatment-induced changes in asymptomatic OD predict outcome? Which measures - or combinations of measures - are most valuable?
- Are lifestyle measures known to reduce BP capable of reducing morbidity and mortality in hypertensive patients?
- Does a treatment-induced reduction of 24h BP variability add to CV protection by antihypertensive treatment?
- Does BP reduction substantially lower CV risk in resistant hypertension?

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