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2013 ESH/ESC Guidelines for the management of arterial hypertension

Take home messages for the clinician

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2013 ESH/ESC Guidelines for the management of arterial hypertension

Diagnostic evaluation

- The initial diagnostic evaluation of the patient with hypertension should:
  - confirm the diagnosis of hypertension,
  - assess CV risk, asymptomatic organ damage and concomitant clinical conditions, and
  - detect causes of secondary hypertension.
- The diagnostic evaluation requires:
  - medical history, including family history,
  - physical examination, including BP measurement,
  - laboratory investigations and diagnostic tests.

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Office blood pressure

'Conventional office BP measurement currently remains the gold standard for screening, diagnosis and management of hypertension'

Definitions and Classification of Blood Pressure Levels (mmHg)

Category	Systolic		Diastolic
Optimal	<120	and	<80
Normal	120 - 129	and/or	80 - 84
High normal	130 - 139	and/or	85 - 89
Grade 1 hypertension	140 - 159	and/or	90 - 99
Grade 2 hypertension	160 - 179	and/or	100 - 109
Grade 3 hypertension	≥180	and/or	≥110
Isolated systolic hypertension	≥140	and	<90

Office BP is the average of at least 2 BP measurements (with a validated device), space 1-2 min apart, after the patient has been sitting for 3-5 min, on at least 2 visits.

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Out-of-office blood pressure

'Out-of-office BP is an important adjunct to office BP'

Diagnostic evaluation
Out-of-office blood pressure

- The major advantage of out-of-office BP monitoring is that it provides a large number of BP measurements away from the medical environment, which represents a more reliable assessment of the actual BP than office BP.
- Out-of-office BP is commonly assessed by

  - ambulatory BP monitoring, or

  - home BP monitoring, usually by self-measurement.
- Both ambulatory BP and home BP have been shown to be better predictors of CV events than office BP.
- Ambulatory and home BP monitoring provide somewhat different information on the subject's BP status and risk, and the two methods should be regarded as complementary, rather than competitive or alternative. The correspondence between the two methods is fair to moderate.

Definitions of hypertension by office and out-of-office blood pressure levels (mmHg)

Category	Systolic		Diastolic
Office BP	≥140	and/or	≥90
Ambulatory BP			
- Daytime (or awake)	≥135	and/or	≥85
- Nighttime (or asleep)	≥120	and/or	≥70
- 24-hour	≥130	and/or	≥80
Home BP	≥135	and/or	≥85

Recommendations on BP measurement

Recommendations	Class	LoE
• Office BP is recommended for screening and diagnosis of hypertension.	I	B
• It is recommended that the diagnosis of hypertension be based on at least two BP measurements per visit and on at least two visits.	I	C
• Out-of-office BP should be considered to confirm the diagnosis of hypertension, identify the type of hypertension, detect hypotensive episodes, and maximize prediction of CV risk.	IIa	B
• For out-of-office BP measurements, ABPM or HBPM may be considered depending on indication, availability, ease, cost of use and, if appropriate, patient preference.	IIb	C

Clinical indications for out-of-office BP measurement for diagnostic purposes (1)

Clinical indications for HBPM or ABPM

- Suspicion of white-coat hypertension
- Suspicion of masked hypertension
- Identification of white-coat effect in hypertensive patients
- Considerable variability of office BP over the same or different visits
- Suspicion of hypotensive episodes
- Elevated office BP or suspected pre-eclampsia in pregnant women
- Identification of true and false resistant hypertension

Clinical indications for out-of-office BP measurement for diagnostic purposes (2)

Specific indications for ABPM

- Marked discordance between office BP and home BP
- Assessment of night-time dipping
- Suspicion of nocturnal hypertension or absence of dipping, such as in patients with sleep apnoea, chronic kidney disease, or diabetes
- Assessment of BP variability

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Assessment of total cardiovascular risk

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The stratification of total cardiovascular risk in different categories in hypertension is based on:

- Blood pressure category
- Other cardiovascular risk factors
- Asymptomatic organ damage
- Presence of diabetes mellitus
- Symptomatic cardiovascular disease or chronic kidney disease

Total cardiovascular risk stratification

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		Low risk	Moderate risk	High risk
1-2 RF	Low risk	Moderate risk	Moderate to high risk	High risk
≥ 3 RF	Low to moderate risk	Moderate to high risk	High risk	High risk
OD, CKD stage 3 or diabetes	Moderate to high risk	High risk	High risk	High to very high risk
Symptomatic CVD, CKD stage ≥4 or diabetes with OD/ RFs	Very high risk	Very high risk	Very high risk	Very high risk

Total cardiovascular risk stratification Blood pressure

- Total CV risk stratification is traditionally based on office BP.
- However, the 2013 update also provides for the consideration of out-of-office BP in the risk stratification model:

✓ patients with high office BP may have normal out-of-office BP (white-coat hypertension); their risk is lower than the risk in sustained hypertension and appears to be similar to that in true normotension.

✓ individuals with high normal office BP may have elevated out-of-office BP (masked hypertension) and their risk is in the hypertension range.

Total cardiovascular risk stratification

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		Low risk	Moderate risk	High risk
1-2 RF	Low risk	Moderate risk	Moderate to high risk	High risk
≥ 3 RF	Low to moderate risk	Moderate to high risk	High risk	High risk
OD, CKD stage 3 or diabetes	Moderate to high risk	High risk	High risk	High to very high risk
Symptomatic CVD, CKD stage ≥4 or diabetes with OD/ RFs	Very high risk	Very high risk	Very high risk	Very high risk

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Laboratory investigations and diagnostic tests

Laboratory investigations and diagnostic tests should progress from the most simple to the more complicated ones, hence the distinction between:

- routine tests,
- additional tests, based on history, physical examination, and findings from routine tests, and
- tests for extended evaluation, mostly domain of the specialist.

Laboratory Investigations
Routine tests

- Haemoglobin and haematocrit
- Fasting plasma glucose
- Serum total, LDL and HDL cholesterol
- Fasting serum triglycerides
- Serum potassium and sodium
- Serum uric acid
- Serum creatinine with estimation of GFR
- Urine analysis: microscopic examination; urinary protein by dipstick test; test for microalbuminuria
- 12-lead electrocardiogram

Laboratory Investigations
Additional tests, based on history, physical examination, and findings from routine tests

- Haemoglobin A_{1c} (if fasting glucose > 5.6 mmol/L (102 mg/dL) or previous diagnosis of diabetes)
- Quantitative proteinuria (if dipstick test positive); urinary potassium and sodium concentration and their ratio
- Home and 24-h ambulatory BP monitoring
- Echocardiogram
- Holter monitoring in case of arrhythmias
- Exercise testing
- Carotid ultrasound
- Peripheral artery/abdominal ultrasound
- Pulse wave velocity
- Ankle-brachial index
- Fundoscopy

Laboratory Investigations
Extended evaluation
(mostly domain of the specialist)

- Further search for cerebral, cardiac, renal, and vascular damage, mandatory in resistant and complicated hypertension.
- Search for secondary hypertension when suggested by history, physical examination, or routine and additional tests.

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Classes of recommendations and levels of evidence on diagnostic evaluation of heart, arteries, kidney, retina and brain

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Initiation of antihypertensive drug treatment

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

Total cardiovascular risk stratification

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		Low risk	Moderate risk	High risk
1-2 RF	Low risk	Moderate risk	Moderate to high risk	High risk
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OD, CKD stage 3 or diabetes	Moderate to high risk	High risk	High risk	High to very high risk
Symptomatic CVD, CKD stage ≥4 or diabetes with OD/ RFs	Very high risk	Very high risk	Very high risk	Very high risk

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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Treatment strategies

Lifestyle changes

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

General recommendations on initiation of antihypertensive drug treatment

Recommendations	Class	LoE
• Grades 2 and 3 hypertension with any level of CV risk: Antihypertensive drug treatment is recommended, a few weeks after or simultaneously with initiation of lifestyle changes.	I	A
• Patients at high total CV risk because of organ damage, diabetes, CVD or CKD, including grade 1 hypertension: Antihypertensive drug treatment is recommended, together with lifestyle changes.	I	B
• Grade 1 hypertension at low to moderate risk: Initiation of antihypertensive drug treatment should be considered , 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
• High normal BP: It is not recommended to initiate drug treatment, unless the necessary evidence is obtained.	III	A

(Adapted from original table)

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Initiation of antihypertensive drug treatment in some specific conditions/populations

Recommendations in white-coat and masked hypertension

Recommendations	Class	LoE
• 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

Recommendations in the elderly

Recommendations	Class	LoE
• In elderly hypertensive patients drug treatment is recommended when SBP is ≥160 mmHg.	I	A
• Antihypertensive drug treatment may also be considered in the elderly (at least when younger than 80 years) when SBP is in the 140-159 mmHg range, provided that antihypertensive treatment is well tolerated.	IIb	C
• In frail elderly patients, it is recommended to leave decisions on antihypertensive 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

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Treatment strategies

Blood pressure goals

Blood pressure goals in hypertensive patients

Recommendations	Class	LoE
• 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
• In elderly hypertensives less than 80 years old with SBP ≥160 mmHg there is solid evidence to recommend reducing SBP to between 150 and 140 mmHg.	I	A
• In fit elderly patients less than 80 years old SBP values <140 mmHg may be considered, whereas in the fragile elderly population SBP goals should be adapted to individual tolerability.	IIb	C
• In individuals older than 80 years and with initial SBP >160 mmHg, it is recommended to reduce SBP to between 150 and 140 mmHg provided they are in good physical and mental condition.	I	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

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Treatment strategies

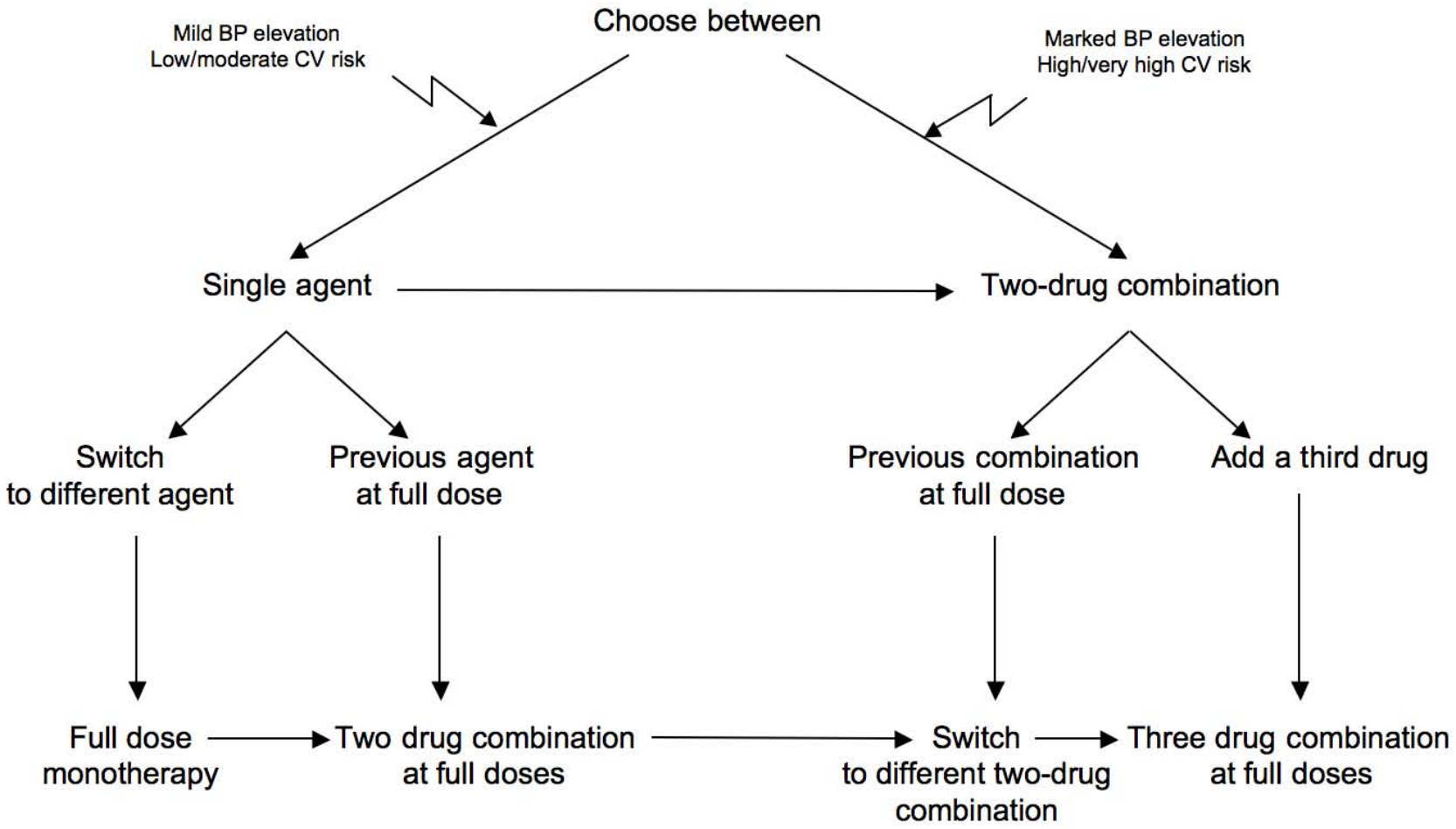
- Choice of drugs
- Monotherapy vs combination therapy

Recommendations on treatment strategies and choice of drugs

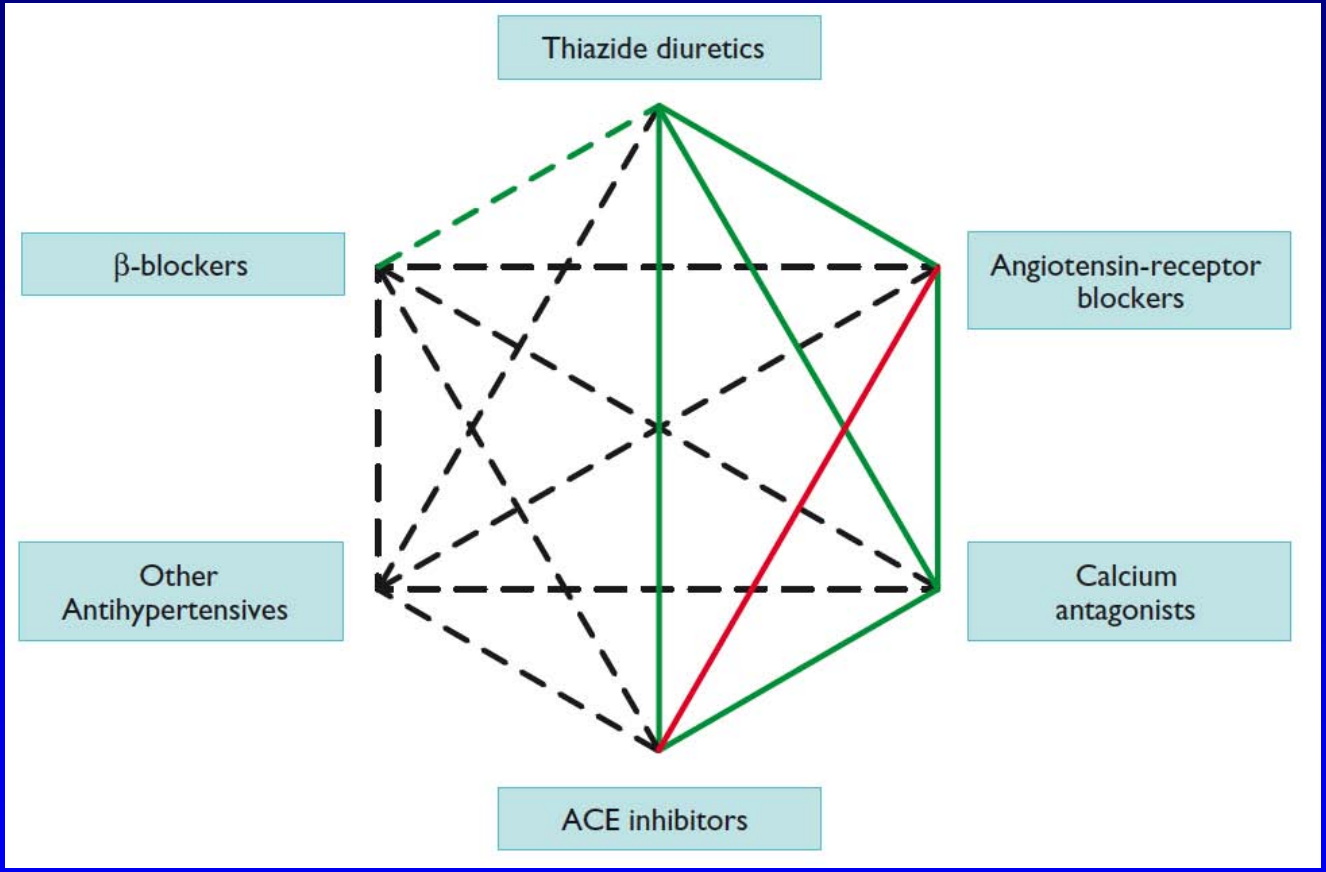
Recommendations	Class	LoE
• Diuretics (thiazides, chlorthalidone and indapamide), beta-blockers, calcium antagonists, ACE inhibitors, and angiotensin receptor blockers are all suitable and recommended for the initiation and maintenance of antihypertensive treatment, either as monotherapy or in some combination 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

Monotherapy vs drug combination therapy

Moving from a less intense to a more intense therapeutic strategy to achieve target blood pressure



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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Follow-up and improvement of blood pressure control

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.

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.