Primary Prevention in Cardiovascular Disease

انجمن قلب ایران
شاخه آذربایجان شرقی
Iranian Heart Association
Cardiovascular Research Center,
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Primary Prevention in Cardiovascular Disease

LIVE WEBINAR

2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease

AMERICAN COLLEGE of CARDIOLOGY

American Heart Association.

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Prevalence of HTN

The prevalence of HTN (defined as systolic blood pressure [SBP] ≥130 mm Hg or diastolic blood pressure [DBP] ≥ 80 mm Hg) among U.S. adults is 46%.

HTN accounts for more ASCVD deaths than any other modifiable ASCVD risk factor.

20–mm Hg higher SBP and 10–mm Hg higher DBP were each associated with a doubling in the risk of death from stroke, heart disease, or other vascular disease.

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Categories of Blood Pressure in Adults

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

- Individuals with SBP and DBP in 2 categories should be designated to the higher BP category.
- BP indicates blood pressure (based on an average of ≥2 careful readings obtained on ≥2 occasions, as detailed in DBP, diastolic blood pressure; and SBP systolic blood pressure.

Risk of atherosclerotic CVD (ASCVD)

ACC/AHA Pooled Cohort Equations **(http://tools.acc.org/ASCVD-Risk-Estimator/)** to estimate 10-year risk of atherosclerotic CVD (ASCVD)

This Equation is validated for U.S. adults **ages 45 to 79 years in the absence of concurrent statin therapy** .

For those **older than age 79, the 10-year ASCVD risk is generally >10%**

Nonpharmacological intervention

appropriate first-line therapy for adults with stage 1 hypertension who have an estimated 10-year ASCVD risk of <10%.

3 groups with ASCVD risk ≥ 10%

1. DM
2. CKD
3. Age >79 years old

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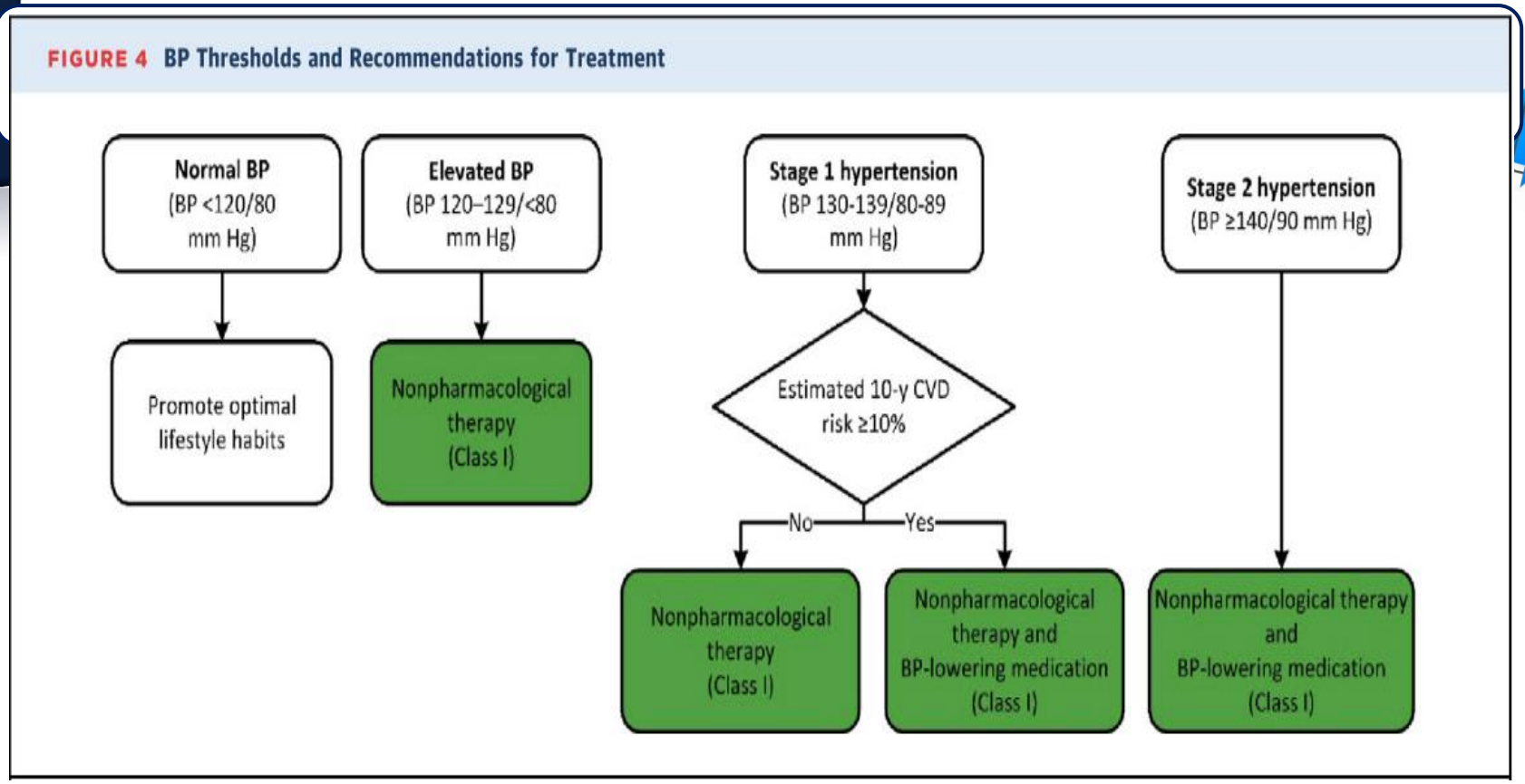
TABLE 7 Best Proven Nonpharmacological Interventions for Prevention and Treatment of Hypertension*

	Nonpharmacological Intervention	Goal	Approximate Impact on SBP		
			Hypertension	Normotension	Reference
Weight loss	Weight/body fat	Best goal is ideal body weight, but aim for at least a 1-kg reduction in body weight for most adults who are overweight. Expect about 1 mm Hg for every 1-kg reduction in body weight.	-5 mm Hg	-2/3 mm Hg	(S4.4-2)
Healthy diet	DASH dietary pattern†	Consume a diet rich in fruits, vegetables, whole grains, and low-fat dairy products, with reduced content of saturated and total fat.	-11 mm Hg	-3 mm Hg	(S4.4-7, S4.4-8)
Reduced intake of dietary sodium	Dietary sodium	Optimal goal is <1500 mg/d, but aim for at least a 1000-mg/d reduction in most adults.	-5/6 mm Hg	-2/3 mm Hg	(S4.4-10, S4.4-12)
Enhanced intake of dietary potassium	Dietary potassium	Aim for 3500–5000 mg/d, preferably by consumption of a diet rich in potassium.	-4/5 mm Hg	-2 mm Hg	(S4.4-14)
Physical activity	Aerobic	■ 90–150 min/wk ■ 65%–75% heart rate reserve	-5/8 mm Hg	-2/4 mm Hg	(S4.4-19, S4.4-20)
	Dynamic resistance	■ 90–150 min/wk ■ 50%–80% 1 rep maximum ■ 6 exercises, 3 sets/exercise, 10 repetitions/set	-4 mm Hg	-2 mm Hg	(S4.4-19)
	Isometric resistance	■ 4 × 2 min (hand grip), 1 min rest between exercises, 30%–40% maximum voluntary contraction, 3 sessions/wk ■ 8–10 wk	-5 mm Hg	-4 mm Hg	(S4.4-21, S4.4-78)
Moderation in alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol‡ to: ■ Men: ≤2 drinks daily ■ Women: ≤1 drink daily	-4 mm Hg	-3 mm Hg	(S4.4-20, S4.4-24, S4.4-25)



Adherence to and impact of nonpharmacological therapy should be assessed within 3 to 6 months.

8.1.5. BP Goal for Patients With Hypertension

Recommendations for BP Goal for Patients With Hypertension References that support recommendations are summarized in Online Data Supplement 26 and Systematic Review Report.		
COR	**LOE**	**Recommendations**
I	SBP: B-R[SR] DBP: C-EO	1. For adults with confirmed hypertension and known CVD or 10-year ASCVD event risk of 10% or higher (see Section 8.1.2), a BP target of less than 130/80 mm Hg is recommended (1-5).
IIb	SBP: B-NR DBP: C-EO	2. For adults with confirmed hypertension, without additional markers of increased CVD risk, a BP target of less than 130/80 mm Hg may be reasonable (6-9).

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TABLE 4 Blood Pressure Goals in Patients With Hypertension According to Clinical Conditions

Category	ESC/ESH 2018	AHA/ACC 2017
Age ≥65 yrs	130 to <140/70 to 79 mm Hg	<130/<80 mm Hg
Diabetes	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg
Coronary artery disease	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg
Chronic kidney disease (eGFR <60 ml/min/1.73 m^2)	130 to <140/70 to 79 mm Hg	<130/<80 mm Hg
Post-stroke	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg

eGFR = estimated glomerular filtration rate; other abbreviations as in Table 1.

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First line agents

8.1.6. Choice of Initial Medication

COR	LOE	Recommendation
I	A^{SR}	1. For initiation of antihypertensive drug therapy, first-line agents include thiazide diuretics, CCBs, and ACE inhibitors or ARBs. (1, 2)

Compelling indication

Gout: diuretics ×

Hypokalemia:diuretics ×

BPH: diuretics ×

IHD, Arrhythmia, HF: BB ✓

Pregnancy: ACEI, ARB ×

DM: ACEI, ARB ✓

NSAID: CCB ✓

Edema: CCB ×

CKD

9.3. Chronic Kidney Disease

Recommendations for Treatment of Hypertension in Patients With CKD References that support recommendations are summarized in Online Data Supplements 37 and 38 and Systematic Review Report.		
COR	**LOE**	**Recommendations**
I	SBP: B-R[SR] DBP: C-EO	1. Adults with hypertension and CKD should be treated to a BP goal of less than 130/80 mm Hg (1-6).
IIa	B-R	2. In adults with hypertension and CKD (stage 3 or higher or stage 1 or 2 with albuminuria [≥300 mg/d, or ≥300 mg/g albumin-to-creatinine ratio or the equivalent in the first morning void]), treatment with an ACE inhibitor is reasonable to slow kidney disease progression (3, 7-12).

CKD

In the course of reducing intraglomerular pressure and thereby reducing albuminuria, **serum creatinine may increase up to 30% because of concurrent reduction in GFR**

HTN and renal transplantation

9.3.1. Hypertension After Renal Transplantation

Recommendations for Treatment of Hypertension After Renal Transplantation References that support recommendations are summarized in Online Data Supplements 39 and 40.		
COR	**LOE**	**Recommendations**
IIa	**SBP: B-NR** **DBP: C-EO**	**1. After kidney transplantation, it is reasonable to treat patients with hypertension to a BP goal of less than 130/80 mm Hg (1).**
IIa	**B-R**	**2. After kidney transplantation, it is reasonable to treat patients with hypertension with a calcium antagonist on the basis of improved GFR and kidney survival (2).**

Most studies favor CCBs to reduce graft loss and maintain higher GFR

HTN and metabolic syndrome

ß-blockers and thiazide diuretics are not recommended in hypertensive patients with multiple metabolic risk factors, due to the increased risk of DM.	III	B

www.escardio.org/guidelines

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High-dose ARB therapy reduces arterial stiffness in patients with hypertension with the metabolic syndrome.

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HTN AND AF

9.8. Atrial Fibrillation

Recommendation for Treatment of Hypertension in Patients With AF References that support the recommendation are summarized in Online Data Supplement 48.		
COR	**LOE**	**Recommendation**
IIa	**B-R**	**1. Treatment of hypertension with an ARB can be useful for prevention of recurrence of AF (1, 2).**

HTN and aortic disease

9.10. Aortic Disease

Recommendation for Management of Hypertension in Patients With Aortic Disease		
COR	LOE	Recommendation
I	C-EO	1. Beta blockers are recommended as the preferred antihypertensive agents in patients with hypertension and thoracic aortic disease (1, 2).

HTN and β-blockers (nonatenolol β-blockers)

1.IHD

2.Arrhythmia

3.HF

4.Thoracic aortic disease

Combination vs single-drug therapy

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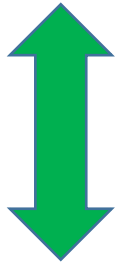
single-drug therapy **reasonable in the very elderly or who have a history of hypotension.**

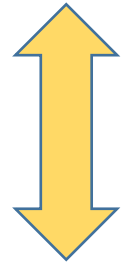
Thiazide diuretics (especially chlorthalidone) or CCBs the best initial choice for single-drug therapy.

ACEI or ARB is not recommended as a single therapy in elderly patient because of low renin level.

Combination therapy

BP = cardiac output × Resistance





V-drugs (Volume) : CCB or Diuretics

R-drugs(Resistance): ACEI or ARB

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COR	LOE	RECOMMENDATIONS
I	A	1. In adults with elevated blood pressure (BP) or hypertension, including those requiring antihypertensive medications nonpharmacological interventions are recommended to reduce BP. These include: ▪ weight loss (S4.4-2-S4.4-5); ▪ a heart-healthy dietary pattern (S4.4-6-S4.4-8); ▪ sodium reduction (S4.4-9-S4.4-13); ▪ dietary potassium supplementation (S4.4-14-S4.4-18); ▪ increased physical activity with a structured exercise program (S4.4-3, S4.4-5, S4.4-11, S4.4-19-S4.4-23); and ▪ limited alcohol (S4.4-24-S4.4-29). Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).
I	SBP:A DBP: C-EO	2. In adults with an estimated 10-year ASCVD risk* of 10% or higher and an average systolic BP (SBP) of 130 mm Hg or higher or an average diastolic BP (DBP) of 80 mm Hg or higher, use of BP-lowering medications is recommended for primary prevention of CVD (S4.4-30-S4.4-38). Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).
I	SBP: B-R[SR] DBP: C-EO	3. In adults with confirmed hypertension and a 10-year ASCVD event risk of 10% or higher, a BP target of less than 130/80 mm Hg is recommended (S4.4-33, S4.4-39-S4.4-42). Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).

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4. In adults with hypertension and chronic kidney disease, treatment to a BP goal of less than 130/80 mm Hg is recommended (S4.4-43-S4.4-48). Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).	I	SBP: B-R[SR] DBP: C-EO
5. In adults with T2DM and hypertension, antihypertensive drug treatment should be initiated at a BP of 130/80 mm Hg or higher, with a treatment goal of less than 130/80 mm Hg (S4.4-33, S4.4-47, S4.4-49-S4.4-54). Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).	I	SBP: B-R[SR] DBP: C-EO
6. In adults with an estimated 10-year ASCVD risk <10% and an SBP of 140 mm Hg or higher or a DBP of 90 mm Hg or higher, initiation and use of BP-lowering medication are recommended (S4.4-36, S4.4-55-S4.4-58). Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).	I	C-LD
7. In adults with confirmed hypertension without additional markers of increased ASCVD risk, a BP target of less than 130/80 mm Hg may be reasonable (S4.4-59-S4.4-62). Adapted from recommendations in the 2017 Hypertension Clinical Practice Guidelines (S4.4-1).	IIb	SBP: B-NR DBP: C-EO

Take home message

1. Nonpharmacological interventions for all patients with HTN
2. Decision to antihypertensive drug therapy: 1)HTN stage, 2)ASCVD score
3. ASCVD score: http://tools.acc.org/ASCVD-Risk-Estimator
4. No need to ASCVD score calculation: CKD, DM, age>79

5. BP treatment goal: less than 130/80

6. First line agents: ACEI or ARB, CCB, Diuretic
7. HTN and β-blockers (nonatenolol β-blockers)
8. Compelling indication
9. Combination therapy except: very elderly or those at risk or who have a history of hypotension (CCB or Diuretic)

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Haemodynamic Pattern in Hypertension

Young : ↑ BP = ↑CO X TPR

Elderly : ↑ BP = ↓ CO X ↑ ↑ TPR

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