

Project Summary

Hypertension Module

Enlight

The abyss of CKD



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CornerRadius

1. **Introduction and BP monitoring**
2. **2017 treatment strategy, goals and approach**
3. **Nephrology perspectives**
4. **Diabetes**
5. **Pregnancy**
6. **Diuretics, beta blockers and interactions**
7. **Other hot issues and resistant hypertension**
8. **Closure**

Q1

- Which cuff bladder size is suitable for a person with mid-arm circumference of 30 cm?
 - a. 15 X 33
 - b. 12 X 23
 - c. 18 X36

BP Cuff Size

TABLE 17.1 Blood Pressure Cuff Size and Error in Measurement*

Cuff Bladder Size	ARM CIRCUMFERENCE		
	28 cm or less	29 to 42 cm	43 cm or more
Regular (12 × 23 cm)	Accurate	Overestimates SBP by 4-8 mm Hg DBP by 3-6 mm Hg	Overestimates SBP by 16-17 mm Hg DBP by 10-11 mm Hg
Large (15 × 33 cm)	Underestimates SBP by 2-3 mm Hg DBP by 1-2 mm Hg	Accurate	Overestimates SBP by 5-7 mm Hg DBP by 2-4 mm Hg
Thigh (18 × 36 cm)	Underestimates SBP by 5-7 mm Hg DBP by 1-3 mm Hg	Underestimates SBP by 5-7 mm Hg DBP by 2-4 mm Hg	Accurate

Home BP Monitoring: Practical Information

Technique

- Use only arm cuffs (not wrist or finger).
- Appropriately sized cuff to match arm size.
- At least 5 min of quiet rest before measurements.
- Obtain readings in duplicate, twice daily (morning before medications and evening before dinner) for 7 d. Use the average of 7 d to make clinical decisions.
- In patients with high blood pressure (BP) variability, there may be value of measuring BP more frequently.

Q2

- Hypertension is diagnosed if automated office BP is equal or exceeds:
 - a. 135/85
 - b. 130/80
 - c. 125/75
 - d. 140/90

Q3

- Masked resistant hypertension stands for
 - a. Normal office, high home and high ambulatory
 - b. High office, normal home and normal ambulatory
 - c. Normal office, high home and normal ambulatory on treatment
 - d. **Normal office, high home or high ambulatory on treatment**
 - e. Normal office, normal home and ambulatory on treatment

2017 Guidelines: BP Monitoring

Guidelines.

1. Health care professionals who have been specifically trained to measure BP accurately should assess BP in all adult patients at all appropriate visits to determine cardiovascular risk and monitor antihypertensive treatment (Grade D).
2. Use of standardized measurement techniques and validated equipment for all methods (automated office BP [AOBP], non-AOBP, home BP monitoring, and ambulatory BP monitoring) is recommended (Grade D)



Canadian Journal of Cardiology 33 (May 2017) 557-576
Guidelines

**Hypertension Canada's 2017 Guidelines for Diagnosis, Risk
Assessment, Prevention, and Treatment of Hypertension in
Adults**

2017 Guidelines: BP Monitoring

The use of home BP monitoring on a regular basis should be considered for patients with hypertension, particularly those with:

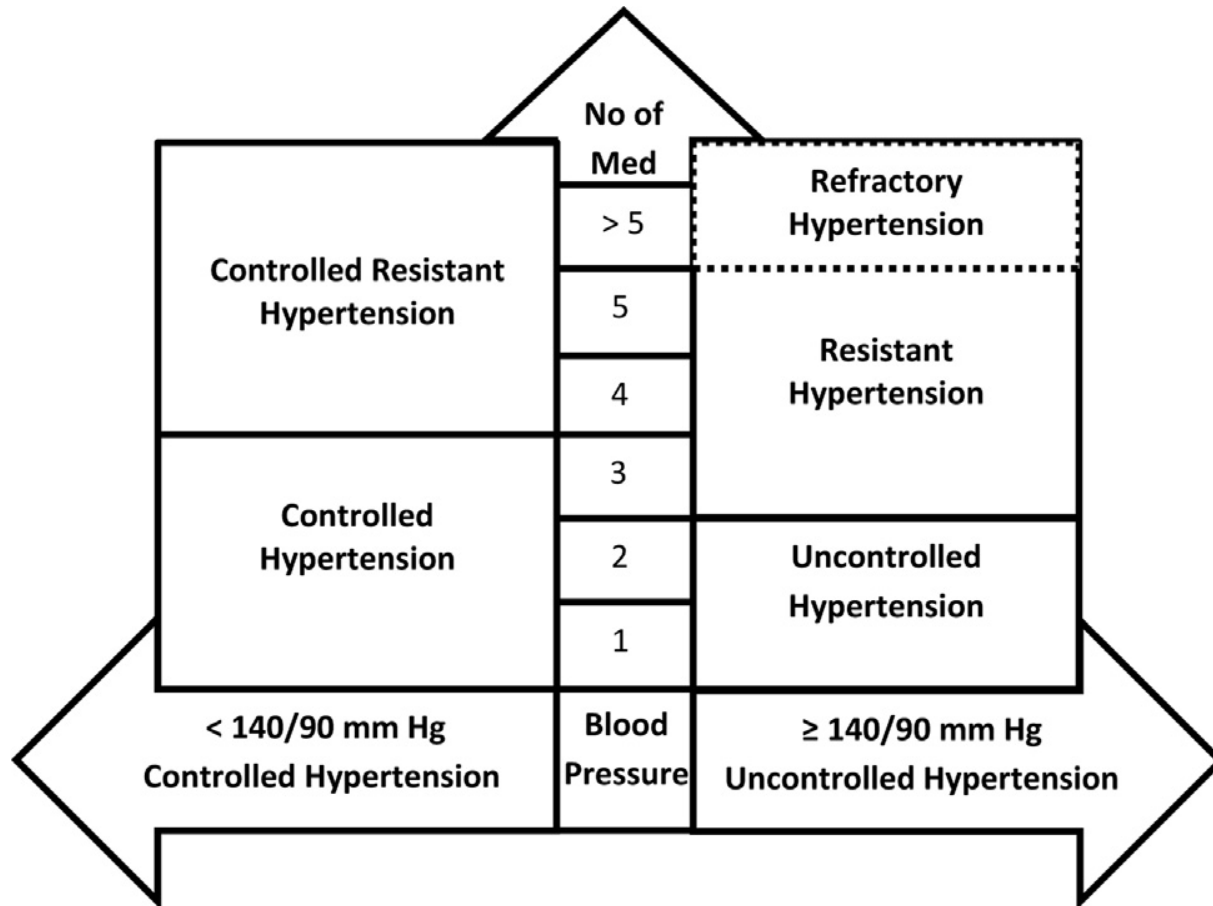
- i. Diabetes mellitus (Grade D);
- ii. Chronic kidney disease (Grade C);
- iii. Suspected non-adherence (Grade D);
- iv. Demonstrated white coat effect (Grade C);
- v. BP controlled in the office but not at home (masked hypertension) (Grade C).



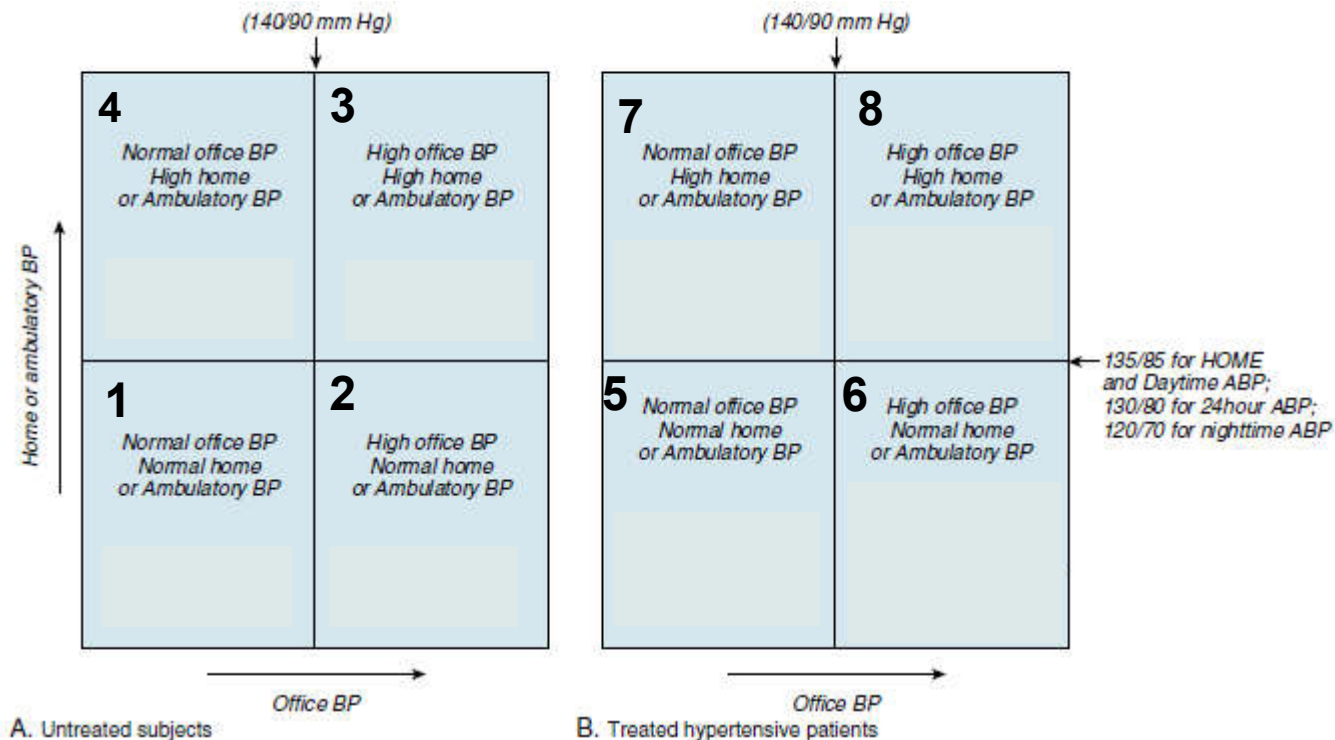
Canadian Journal of Cardiology 33 (May 2017) 557-576
Guidelines

**Hypertension Canada's 2017 Guidelines for Diagnosis, Risk
Assessment, Prevention, and Treatment of Hypertension in
Adults**

Blood pressure: Controlled/ Uncontrolled



What is The Diagnosis?



12

White-Coat and Masked Hypertension

Gianfranco Parati and Juan Eugenio Ochoa



Corners

1. Introduction and BP monitoring
2. **2017 treatment strategy, goals and approach**
3. Nephrology perspectives
4. Diabetes
5. Pregnancy
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7. Other hot issues and resistant hypertension
8. Closure

Hypertension Treatment: 2017 Canadian Guidelines



Canadian Journal of Cardiology 33 (May 2017) 557-576
Guidelines

Hypertension Canada's 2017 Guidelines for Diagnosis, Risk Assessment, Prevention, and Treatment of Hypertension in Adults

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Lifestyle modifications in the man

Modification	Recommendation	Approximate systolic BP reduction, range*
Weight reduction	Maintain normal body weight (BMI, 18.5 to 24.9 kg/m ²)	5 to 20 mmHg per 10 kg weight loss
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat	8 to 14 mmHg
Dietary sodium reduction	Reduce dietary sodium intake to no more than 100 meq/day (2.4 g sodium or 6 g sodium chloride)	2 to 8 mmHg
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 minutes per day, most days of the week)	4 to 9 mmHg
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks per day in most men and no more than 1 drink per day in women and lighter-weight persons	2 to 4 mmHg

salt or 87 mmol of sodium) per day (Grade A).

In patients not at risk of hyperkalemia, increase dietary potassium intake to reduce BP (Grade A).

Q4

- Which one of the following antihypertensive drugs is the 1st choice as monotherapy?
 - a. Thiazide diuretics**
 - b. β blockers
 - c. ACEIs/ARBs
 - d. Calcium channel blockers

Q5

- Which one of the following antihypertensive drugs is last choice in elderly?
 - a. Thiazide diuretics
 - b. **β blockers**
 - c. ACEIs/ARBs
 - d. Calcium channel blockers

Hypertension Treatment: 2017 Canadian Guidelines

1. Antihypertensive therapy should be prescribed for average DBP measurements of ≥ 100 mmHg (Grade A) or average SBP measurements of ≥ 160 mmHg (Grade A) in patients
 - ii. Recommended SPC choices are those in which an ACE inhibitor is combined with a CCB (Grade A; **new guideline**), ARB with a CCB (Grade B; **new guideline**), or ACE inhibitor or ARB with a diuretic (Grade B; **new guideline**).
 - iii. Hypokalemia should be avoided in patients treated with thiazide/thiazide-like diuretic monotherapy (Grade C).

Hypertension Treatment: 2017 Canadian Guidelines

α -Blockers are not recommended as first-line agents for uncomplicated hypertension (Grade A); β -blockers are not recommended as first-line therapy for uncomplicated hypertension in patients 60 years of age or older (Grade A); and ACE inhibitors are not recommended as first-line therapy for uncomplicated hypertension in black patients (Grade A). However, these agents may be used in patients with certain comorbid conditions or in combination therapy.

Hypertension Management: Choice of Drugs

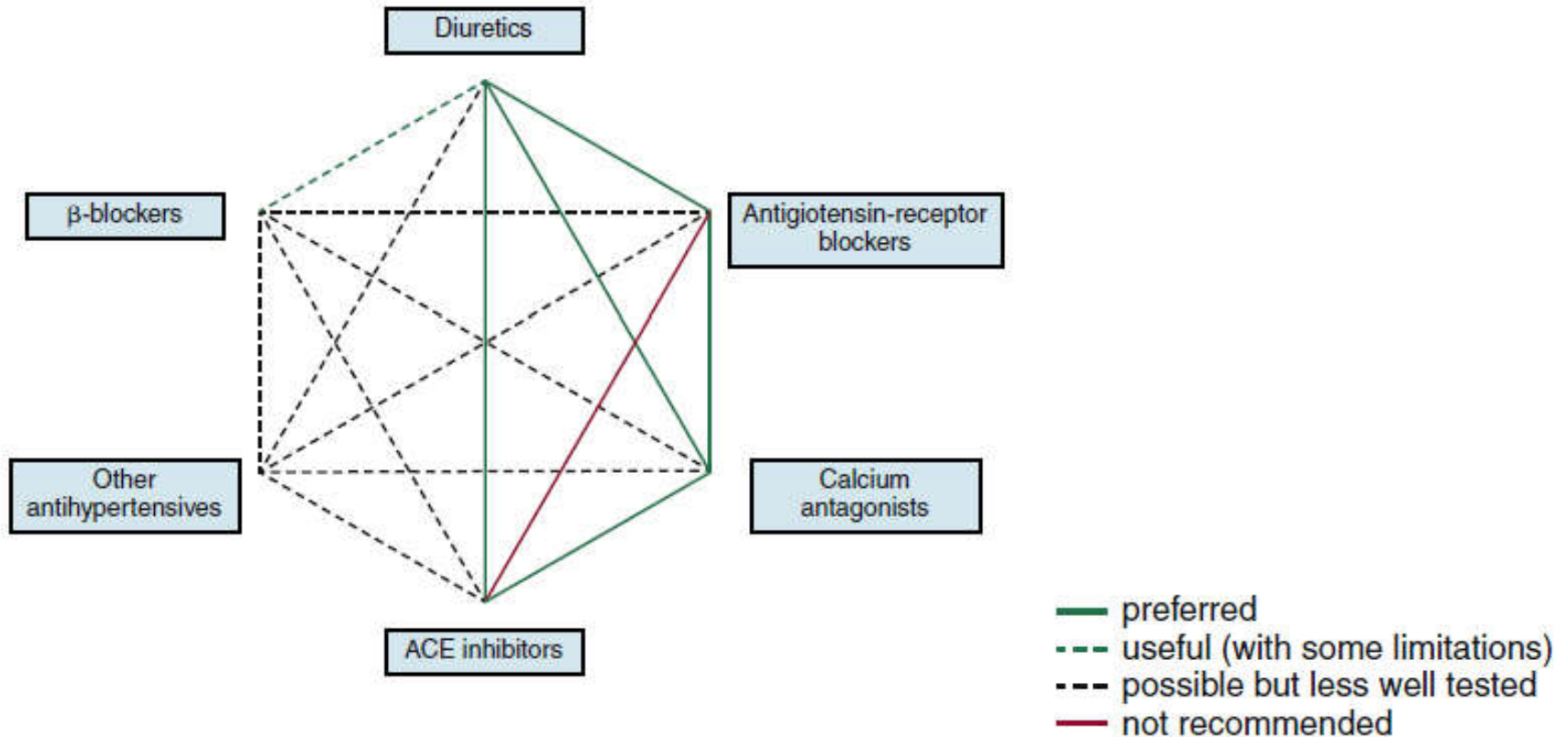
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Considerations for individualizing antihypertensive therapy

Contraindications	
Angioedema	ACE inhibitor
Bronchospastic disease	Beta blocker
Depression	Reserpine
Liver disease	Methyldopa
Pregnancy (or at risk for)	ACE inhibitor, ARB, renin inhibitor
Second- or third-degree heart block	Beta blocker, nondihydropyridine calcium channel blocker
May have adverse effect on comorbid conditions	
Depression	Beta blocker, central alpha-2 agonist
Gout	Diuretic
Hyperkalemia	Aldosterone antagonist, ACE inhibitor, ARB, renin inhibitor
Hyponatremia	Thiazide diuretic
Renovascular disease	ACE inhibitor, ARB, or renin inhibitor

Hypertension:

Two-Drug combinations



Severe Asymptomatic Hypertension

SORT: KEY RECOMMENDATIONS FOR PRACTICE

<i>Clinical recommendation</i>	<i>Evidence rating</i>
Patients with severely elevated blood pressure should have a history and physical examination to distinguish between severe asymptomatic hypertension and hypertensive emergency.	C
A 30-minute rest period is recommended when the initial blood pressure reading is severely elevated. In more than 30% of patients, the blood pressure will lower to an acceptable level without intervention following the rest period.	C
An immediate diagnostic evaluation is not required in the initial management of severe asymptomatic hypertension.	C
Aggressive lowering of blood pressure can be harmful and should be avoided in patients with severe asymptomatic hypertension. Gradual reduction over several days to weeks is recommended.	C

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to <http://www.aafp.org/afpsort>.

Hypertension Guidelines: Goal and Target

Clinical Review & Education

Special Communication

2014 Evidence-Based Guideline for the Management
of High Blood Pressure in Adults

Report From the Panel Members Appointed
to the Eighth Joint National Committee (JNC 8)

CKD

<140/90

ACEI or ARB

Hypertension in Elderly: ACP Guidelines



Summary of the American College of Physicians and American Academy of Family Physicians Joint Guideline on Pharmacologic Treatment of Hypertension in Adults Aged 60 Years or Older to Higher Versus Lower Blood Pressure Targets

Recommendations

Recommendation 1: ACP and AAFP recommend that clinicians initiate treatment in adults aged 60 years or older with systolic blood pressure persistently at or above 150 mm Hg to achieve a target systolic blood pressure of less than 150 mm Hg to reduce the risk for mortality, stroke, and cardiac events. (Grade: strong recommendation, high-quality evidence). ACP and AAFP recommend that clinicians select the treatment goals for adults aged 60 years or older based on a periodic discussion of the benefits and harms of specific blood pressure targets with the patient.

Recommendation 2: ACP and AAFP recommend that clinicians consider initiating or intensifying pharmacologic treatment in adults aged 60 years or older with a history of stroke or transient ischemic attack to achieve a target systolic blood pressure of less than 140 mm Hg to reduce the risk for recurrent stroke. (Grade: weak recommendation, moderate-quality evidence). ACP and AAFP recommend that clinicians select the treatment goals for adults aged 60 years or older based on a periodic discussion of the benefits and harms of specific blood pressure targets with the patient.

Recommendation 3: ACP and AAFP recommend that clinicians consider initiating or intensifying pharmacologic treatment in some adults aged 60 years or older at high cardiovascular risk, based on individualized assessment, to achieve a target systolic blood pressure of less than 140 mm Hg to reduce the risk for stroke or cardiac events. (Grade: weak recommendation, low-quality evidence). ACP and AAFP recommend that clinicians select the treatment goals for adults aged 60 years or older based on a periodic discussion of the benefits and harms of specific blood pressure targets with the patient.

Isolated Systolic Hypertension

2017 Canadian Guidelines



Canadian Journal of Cardiology 33 (2017) 557–576

Guidelines

Hypertension Canada's 2017 Guidelines for Diagnosis, Risk Assessment, Prevention, and Treatment of Hypertension in Adults

B. Guidelines for individuals with isolated systolic hypertension

Guidelines.

1. Initial therapy should be single-agent therapy with a thiazide/thiazide-like diuretic (Grade A), a long-acting dihydropyridine CCB (Grade A), or an ARB (Grade B). If there are adverse effects, another drug from this group should be substituted. Hypokalemia should be avoided in patients treated with thiazide/thiazide-like diuretic monotherapy (Grade C).
2. Additional antihypertensive drugs should be used if target BP levels are not achieved with standard-dose monotherapy (Grade B). Add-on drugs should be chosen from first-line options (Grade D).

Q6

- Intensive blood pressure control (SBP <120) is risky in:
 - a. CKD (GFR 20-60 ml/min/1.73 m²)
 - b. Cardiac disease
 - c. Age ≥75 years
 - d. Diabetes mellitus**

Corners

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Q7

- The goal blood pressure in CKD patients with albuminuria ≥ 300 mg/day is:
 - a. $< 150/90$
 - b. $< 140/90$
 - c. $< 130/80$**
 - d. $< 125/75$

Q8

- The best strategy to control blood pressure in dialysis is:
 - a. Low salt in diet
 - b. Adjust ideal body weight**
 - c. Add ACEIs/ARBs
 - d. Add calcium channel blocker

Q9

- Which one of the following is an indication for revascularization in patients with renal artery stenosis?
 - a. Stenosis of 50% of the renal artery lumen
 - b. Small size kidney
 - c. blood pressure controlled on 2 drugs
 - d. **Acute renal failure following the use of ACE**

Q10

- Which one of the following antihypertensive drugs is associated with the lowest risk of renal stones formation?
 - a. Thiazide diuretics**
 - b. β blockers
 - c. ACEIs/ARBs
 - d. Calcium channel blockers

Hypertension and CKD: BP Target

Office BP	Albuminuria	Target	Agent	Grade
>140/90	<30 mg	≤ 140/90	Any drug	1B
> 130/80	≥ 30 mg	≤ 130/80		2D
	30-300 mg	≤ 130/80	ARB or ACEi	2D
	>300 mg	≤ 130/80	ARB or ACEi	1B

For diabetics and non diabetics

Secondary Hypertension: Renovascular Hypertension

3. Patients with hypertension and presenting with at least one of the following clinical clues should be investigated for fibromuscular dysplasia (FMD)-related renal artery stenosis

(Grade D; **new guideline**):

- i. Age <30 years, especially in non-obese women;
- ii. Hypertension resistant to ≥ 3 drugs;
- iii. Significant ($>1.5\text{cm}$), unexplained asymmetry in kidney sizes;
- iv. Abdominal bruit without apparent atherosclerosis;
- v. FMD in another vascular territory;
- vi. Positive family history for FMD.

Hypertension in CKD: 2017 Canadian Guidelines

	Initial therapy	Second-line therapy	Notes and/or cautions
Non-diabetic chronic kidney disease			
Non-diabetic chronic kidney disease with proteinuria†	ACE inhibitors (ARBs if ACE inhibitor-intolerant) if there is proteinuria Diuretics as additive therapy	Combinations of additional agents	Carefully monitor renal function and potassium for those on an ACE inhibitor or ARB.
Renovascular disease	Does not affect initial treatment recommendations Atherosclerotic renal artery stenosis should be primarily managed medically, while revascularization should be considered for renal fibromuscular dysplasia	Combinations of additional agents	Caution with ACE inhibitors or ARB if bilateral renal artery stenosis or unilateral disease with solitary kidney. Renal artery angioplasty and stenting could be considered for patients with renal artery stenosis and complicated, uncontrolled hypertension



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Q11

- The level to start antihypertensive drugs in patients with DM is a SBP of:
 - a. > 130 mmHg
 - b. > 140 mmHg**
 - c. > 150 mmHg
 - d. > 160 mmHg

Hypertension and Diabetes

 HYPERTENSION

When should we treat hypertension in patients with diabetes?

Sverre E. Kjeldsen and Ingrid Os

BP-lowering therapy and diabetes

Baseline systolic BP	Effects of BP-lowering treatment
>150 mmHg	↓ All-cause mortality ↓ Cardiovascular mortality ↓ Myocardial infarction ↓ End-stage renal disease

NATURE REVIEWS | **CARDIOLOGY** 2016

Brunström, M. & Carlberg, B. Effect of antihypertensive treatment at different blood pressure levels in patients with diabetes mellitus: systematic review and meta-analyses. *BMJ* 352, i717 (2016).

Hypertension and Diabetes

Patients with hypertension and diabetes	Grade of recommendation	Level of evidence
a. Antihypertensive therapy is strongly recommended in patients with diabetes and systolic blood pressure ≥ 140 mmHg.	Strong	I
b. In patients with diabetes and hypertension, any of the first-line antihypertensive drugs that effectively lower blood pressure are recommended.	Strong	I
c. In patients with diabetes and hypertension, a blood pressure target of $< 140/90$ mmHg is recommended.	Strong	I
d. A systolic blood pressure target of < 120 mmHg may be considered for patients with diabetes in whom prevention of stroke prioritised.	Weak	–
e. In patients with diabetes where treatment is being targeted to < 120 mmHg systolic, close follow-up of patients is recommended to identify treatment related adverse effects including hypotension, syncope, electrolyte abnormalities and acute kidney injury.	Strong	–

Hypertension and DM: 2017 Canadian Guidelines



Canadian Journal of Cardiology 33 (2017) 557–576

Guidelines

Hypertension Canada's 2017 Guidelines for Diagnosis, Risk Assessment, Prevention, and Treatment of Hypertension in Adults

2. For persons with cardiovascular or kidney disease, including microalbuminuria, or with cardiovascular risk factors in addition to diabetes and hypertension, an ACE inhibitor or an ARB is recommended as initial therapy (Grade A).
3. For persons with diabetes and hypertension not included in other guidelines in this section, appropriate choices include (in alphabetical order): ACE inhibitors (Grade A), ARBs (Grade B), dihydropyridine CCBs (Grade A), and thiazide/thiazide-like diuretics (Grade A).

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Hypertension Disorders of Pregnancy

Table 2 | Hypertensive disorders of pregnancy

	Characteristics
Preeclampsia	Preeclampsia is diagnosed in the setting of hypertension in association with thrombocytopenia, impaired liver function tests, the new development of renal insufficiency, pulmonary edema, or new-onset cerebral or visual disturbances
Chronic hypertension	Antihypertensive requirement before pregnancy or hypertension beginning before the 20th week of pregnancy or hypertension continuing for >12 weeks after delivery
Chronic hypertension with superimposed preeclampsia	Combination of the two
Gestational hypertension	Blood pressure elevation after 20 weeks of gestation in the absence of proteinuria, thrombocytopenia, impaired liver function, new onset of kidney dysfunction, pulmonary edema, or new cerebral or visual disturbances

Hypertension Disorders of Pregnancy

Drug	Main features with respect to side effects in CKD	FDA “classic” labeling
To be avoided		
Short-acting nifedipine	Contraindicated by the FDA, RCOG, and AIPE due to the risk of severe hypotension with detrimental effects on placental flows. Severe sudden hypotension may have detrimental effects on kidney function	D
ACEi ARBs	Contraindicated due to the risk of major malformations, including cardiovascular, central nervous system, renal, and bone. These drugs are often implicated in AKI, and this may be particularly relevant in pregnant CKD patients	C 1st D 2nd 3rd

Curr Hypertens Rep (2016) 18: 35
DOI 10.1007/s11906-016-0644-7



PREECLAMPSIA (V GAROVIC, SECTION EDITOR)

Hypertension in CKD Pregnancy: a Question of Cause and Effect (Cause or Effect? This Is the Question)

Giorgina Barbara Piccoli^{1,2} · Gianfranca Cabiddu³ · Rossella Attini⁴ · Silvia Parisi⁴ · Federica Fassio⁴ · Valentina Loi³ · Martina Gerbino⁵ · Marilisa Biolcati⁴ · Antonello Pani³ · Tullia Todros⁴

Q12

- Which antihypertensive drug to be avoided in lactation?
 - a. methyldopa
 - b. diltiazem
 - c. Propranolol
 - d. Nifedipine
 - e. Atenolol**

AntiHypertensive Therapy in Lactation

- **Neonatal exposure to methyldopa, diltiazem, propranolol, enalapril, captopril, and nifedipine via nursing are low.**
- **Atenolol and metoprolol are concentrated in breast milk.**
- **Diuretics?**

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Hypertension: Use of Diuretics

Pharmacokinetics and Pharmacodynamics of Diuretics

DRUG	PERCENT ABSORBED	ONSET (HOURS)	PEAK (HOURS)	HALF-LIFE (HOURS)	DURATION (HOURS)	EVIDENCE-BASED DOSE (MG/DAY)	NUMBER OF DOSES PER DAY
Thiazide-Like							
Bendroflumethiazide	90-100	2	4	3-4	6-12	10	1
Chlorthalidone	65	2-3	2-6	45-60	48-72	12.5-25	1
Hydrochlorothiazide	65-75	2	4-6	8-15	12-16	25-50	1-2
Indapamide	90	1-2	2	15-20	24-36	1.25	1
Potassium-Sparing							
Amiloride	20	2	6-10	6-9	24	5-10	1
Eplerenone	70	1-2	2	4-6	24	25-50	1
Spirolactone	90	24-48	48-72	48-72	24-36	12.5-50	1
Triamterene	>80	2-4	6-8	3	12-16	100-200	2
Loop							
Bumetanide	72-96	0.5-1	1-2	1-2	4-6	0.5-2	1-2
Furosemide	10-100	0.5-1	6-8	1.5-2	6-8	40-80	2
Torsemide	80	0.5-1	1-2	3.5	6-8	5-10	1-2

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Diuretics in Hypertension

Barry L. Carter and Michael E. Ernst

Beta Blockers Scenario

The Real Role of

Csaba András Dézsi¹ · Vere

Table 1 Characteristics of commonly used β -blockers

Drug	Indications in CVD (other than hypertension ^a)	Daily dose (mg/day)	Half-life (h)	Route of excretion	β_1 -Selectivity	ISA	α_1 -Antagonist activity	Membrane stabilizing property	Vasodilatory action
							-	-	-
							-	-	-
							-	-	-
							+	+	+
							-	+	-
							-	-	-
							-	-	+
							-	+	-

^aactivity, *MI* myocardial infarction

Key Points

β -Adrenoceptor antagonists (β -blockers) are recommended for the first-line treatment of heart failure, coronary artery disease, and atrial fibrillation as well as of hypertension complicated with heart failure, angina pectoris, or prior myocardial infarction.

β -Blockers should not be withheld from patients with diabetes mellitus or chronic obstructive pulmonary disease, although cardioselective agents are preferable.

Q13

- Which one of beta blockers may be used in patients with erectile dysfunction?
 - a. Atenolol
 - b. Nebivolol**
 - c. Bisoprolol
 - d. Metoprolol
 - e. Propranolol

Beta Blockers Scenario

Differential Metabolic Effects of Beta-Blockers: an Updated Systematic Review of Nebivolol

Maria Marketou¹ · Yashaswi Gupta² · Shashank Jain² · Panos Vardas¹

Curr Hypertens Rep. 2017 Mar;19(3):22.



Therapeutic Advances in Urology

Review

Nebivolol *versus* other beta blockers in patients with hypertension and erectile dysfunction

Randall P. Sharp and Barry J. Gales

Ther Adv Urol

2017, Vol. 9(2) 59–63

DOI: 10.1177/
1756287216685027

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Q14

- Which antibiotic is risky to combine with dihydropyridine calcium channel blockers?
 - a. Tetracycline
 - b. Clarithromycin**
 - c. Emipenem
 - d. vancomycin
 - e. tegacycline

Hypertension: Drug Interactions

Original Investigation

Transplant International

LETTER TO THE EDITORS

Severe hypertension after initiation of rifapentine/ isoniazid for latent tuberculosis in renal transplant candidates

Jacques Simkins, Michele I. Morris, Lilian M. Abbo & Jose F. Camargo

Transpl Int. 2017 Jan;30(1):108-109

Corners

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Q15

- Which of the following is not preferred in the presence of heart failure ?
 - a. BB
 - b. ACEI
 - c. CCB**
 - d. Aldosterone antagonists
 - e. Neprilysin inhibitors

Heart Failure Management

Heart Failure Management in 2017

Magdy Abdel Hamid , MD , FSCAI
 Professor of Cardiology
 Faculty of Medicine , Cairo University



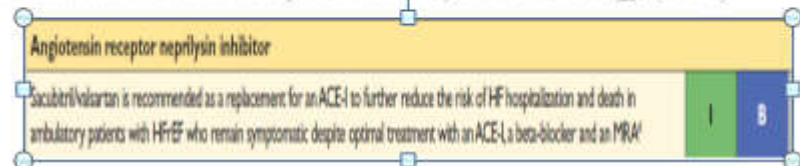
18th Domyat Cardiovascular & Diabetes Conference

14 April 2017

Recommendations	Class ^a	Level ^b
An ACE-I ^d is recommended, in addition to a beta-blocker, for symptomatic patients with HFrEF to reduce the risk of HF hospitalization and death.	I	A
A beta-blocker is recommended, in addition an ACE-I ^d , for patients with stable, symptomatic HFrEF to reduce the risk of HF hospitalization and death.	I	A
An MRA is recommended for patients with HFrEF, who remain symptomatic despite treatment with an ACE-I ^d and a beta-blocker, to reduce the risk of HF hospitalization and death.	I	A

2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC)



Q16

- β blockers is indicated for treating hypertension in patients with:
 - a. Atrial fibrillation**
 - b. Chronic kidney disease
 - c. Old age
 - d. Benign prostatic hyperplasia

Q17

- Which one of the following antihypertensive drugs can prevent atrial fibrillation?
 - a. Thiazide diuretics
 - b. Alpha blockers
 - c. ACEIs/ARBs**
 - d. Calcium channel blockers

Hypertension and Atrial Fibrillation

Received: 14 September 2016 | Accepted: 18 September 2016

DOI: 10.1111/jch.12939

DEPARTMENT COLUMN

WILEY

Blood pressure in patients with atrial fibrillation: part 2—treatment

Debbie L. Cohen, MD | Raymond R. Townsend, MD

Renal, Electrolyte and Hypertension Division, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, U

**Atrial Fibrillation in Hypertensive
Patients: *Facing Killers Union***



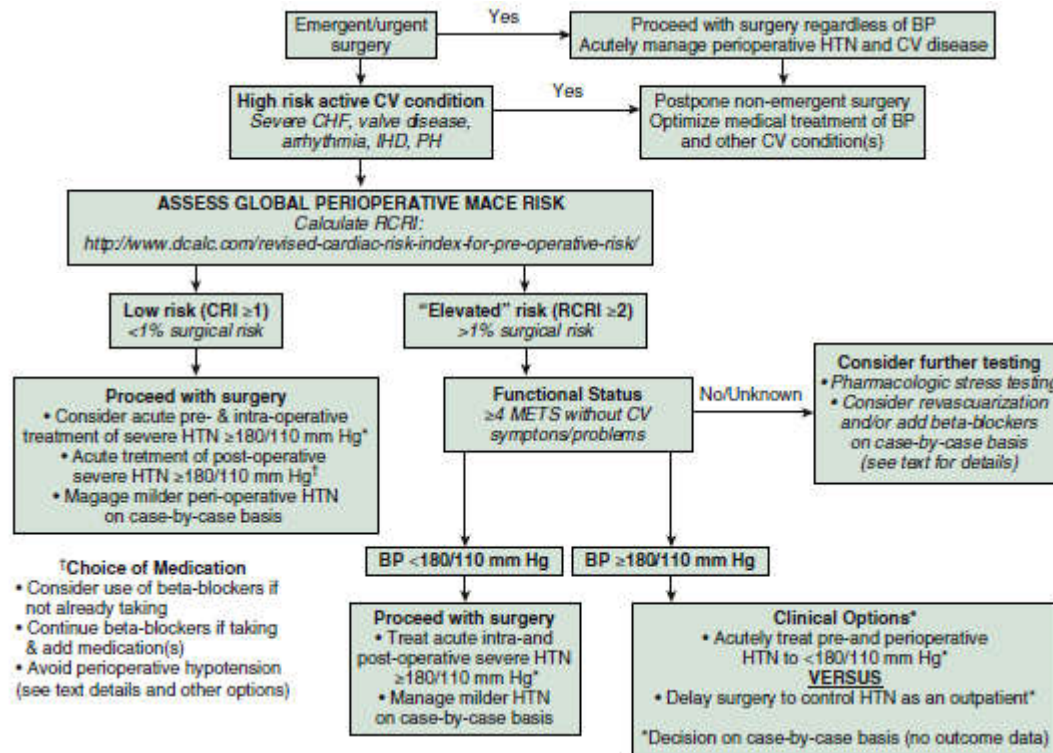
Dr. Walid Ammar

Associate professor of Cardiology
Cairo University

Q18

- Which antihypertensive constitutes a risk if discontinued before surgery?
 - a. **Beta blockers**
 - b. ACEIs
 - c. ARBs
 - d. CCB
 - e. Thiazide

Hypertension and Surgery



Resistant Hypertension: Search for Drugs

Table 2. Common prescription and nonprescription drugs that can raise BP

Prescription Drugs
Anabolic steroids
Antidepressants
Monoamine oxidase inhibitors
Selective serotonin reuptake inhibitor
Selective norepinephrine uptake inhibitors
Norepinephrine transporter inhibitors
Calcineurin inhibitors
Cyclosporin
Tacrolimus
Glucocorticoids
Erythropoietin
Contraceptives
Estrogen containing
Progesterone containing
NSAIDs
Sympathomimetics
VEGF inhibitors
Tyrosine kinase inhibitors
Amphetamines (in context of ADHD)

NSAID, non-steroidal anti-inflammatory drugs; VEGF, vascular endothelial growth factor; ADHD, attention-deficit hyperactivity disorder.

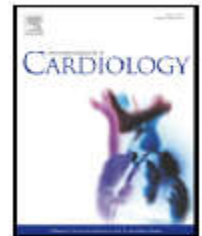
Resistant Hypertension: Spironolactone Scenario



Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard



A meta-analysis of add-on use of spironolactone in patients with resistant hypertension



Di Zhao ^{a,*}, Hui Liu ^{b,1}, Pingshuan Dong ^c, Jingdong Zhao ^c

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Characteristics of studies included in the meta-analysis.

Study	Design (blind)	Setting	Location	Drug	Doses
Abolghasmi et al., 2011	Randomized, double	Single center	Iran	Spironolactone	25–50 mg/d
Oxlund et al., 2013	Randomized, double	Single center	Denmark	Spironolactone	25–50 mg/d
Václavík et al., 2014	Randomized, double	Multicenter	Czech Republic	Spironolactone	25 mg/d
Williams et al., 2015	Randomized, double	Multicenter	United Kingdom	Spironolactone	25–50 mg/d

International Journal of Cardiology 233 (2017) 113–117

Resistant Hypertension Interventions



Contents lists available at ScienceDirect

Autonomic Neuroscience: Basic and Clinical

journal homepage: www.elsevier.com/locate/autneu

Review

Renal denervation and hypertension - The need to investigate unintended effects and neural control of the human kidney

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Review

Evaluating the carotid bodies and renal nerves as therapeutic targets for hypertension

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Resistant Hypertension

Recommendations

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Resistant hypertension: Diagnostic recommendations

Resistant hypertension: Diagnostic and treatment recommendations

Confirm treatment resistance

- Office blood pressure >140/90 or 130/80 mmHg on three or more occasions or coronary artery disease

AND

- Patient prescribed three or more antihypertensive agents, including a diuretic

OR

- Office blood pressure at goal but patient remains symptomatic

Exclude pseudoresistance

- Is patient adherent with prescribed regimen?
- Obtain home, work, or ambulatory blood pressure

Identify and reverse contributing life

- Obesity
- Physical inactivity
- Excessive alcohol ingestion
- High salt, low fiber diet

Discontinue or minimize interfering substances

- Nonsteroidal antiinflammatory agents
- Sympathomimetics (diet pills, decongestants)
- Stimulants
- Oral contraceptives
- Licorice
- Ephedra

Screen for secondary causes of hypertension

- Obstructive sleep apnea (snoring, witnessed apnea, excessive daytime sleepiness)
- Primary aldosteronism (elevated aldosterone/renin ratio)
- Chronic kidney disease (creatinine clearance <30 mL/min)
- Renal artery stenosis (young female, known atherosclerotic disease, worsening renal function)
- Pheochromocytoma (episodic hypertension, palpitations, diaphoresis, headache)
- Cushing's syndrome (moon facies, central obesity, abdominal striae, interscapular fat deposition)
- Aortic coarctation (differential in brachial or femoral pulses, systolic bruit)

Pharmacologic treatment

- Maximize diuretic therapy, including possible addition of mineralocorticoid receptor antagonist
- Combine agents with different mechanisms of action
- Use of loop diuretics in patients with chronic kidney disease and/or patients receiving potent vasodilators (eg, minoxidil)

Refer to specialist

- Refer to appropriate specialist for known or suspected secondary cause(s) of hypertension
- Refer to hypertension specialist if blood pressure remains uncontrolled after six months of treatment

Corners

1. Introduction and BP monitoring
2. 2017 treatment strategy, goals and approach
3. Nephrology perspectives
4. Diabetes
5. Pregnancy
6. Diuretics, beta blockers and interactions
7. Other hot issues and resistant hypertension
8. **Closure**

Hypertension Treatment in The Future



SECTION IX

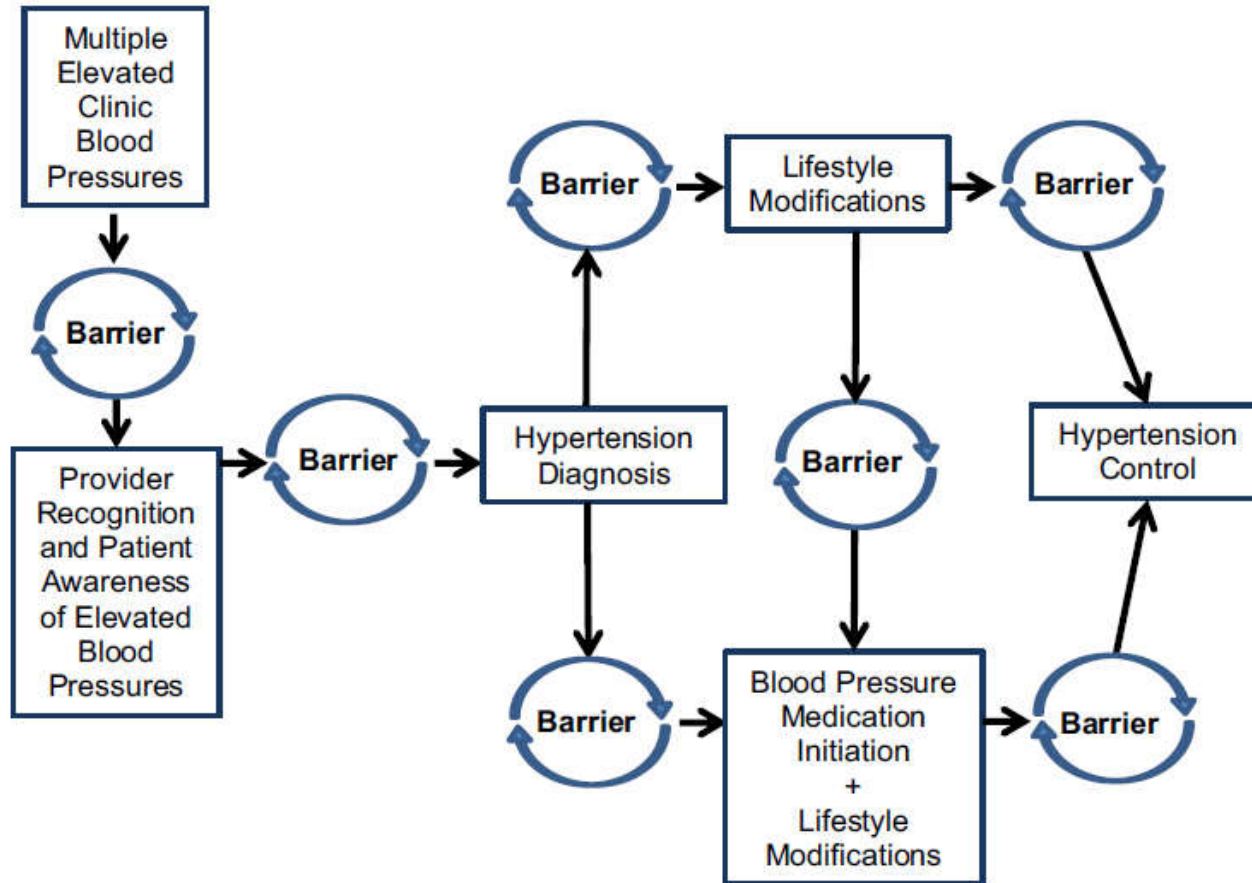
HYPERTENSION TREATMENT IN THE FUTURE

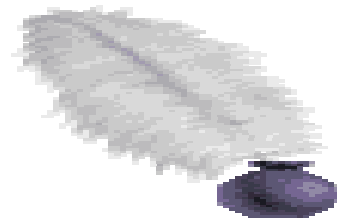
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Team-Based Care for Hypertension Management

Barry L. Carter

Hypertension Treatment: Barriers





“Live as if you were to die tomorrow. Learn as if you were to live forever.”

- ~ Mahatma Gandhi