# تازه های پرفشاری خون بر

# اساس گایدلاین ISH2020

## (به روش معرفی بیمار)

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A 65 years old woman comes to your office. Her BP with ABPM= 160/110.

She has no comorbid conditions.

What is your advice?

a) Lifestyle advice

b) Lifestyle advice and immediate drug treatment

c) Lifestyle advice for 3 months then drug treatment

d)Immediate drug treatment

A 55 years old man with type 2 DM with headache. His BP with ABPM= 150/95.

What is your advice?

a) Lifestyle advice

b) Lifestyle advice and immediate drug treatment

c) Lifestyle advice for 3 months then drug treatment

d)Immediate drug treatment

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A 70 years old man with no comorbid conditions. His BP with ABPM= 150/90.

What is your advice?

a) Lifestyle advice

b) Lifestyle advice and immediate drug treatment

c) Lifestyle advice for 3 months then drug treatment

d)Immediate drug treatment

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# Basic and Optional Laboratory Tests for Primary Hypertension

| | |
|---|---|
| **Basic testing** | Fasting blood glucose* |
| | Complete blood count |
| | Lipid profile |
| | Serum creatinine with eGFR* |
| | Serum sodium, potassium, calcium* |
| | Thyroid-stimulating hormone |
| | Urinalysis |
| | Electrocardiogram |
| **Optional testing** | Echocardiogram |
| | Uric acid |
| | Urinary albumin to creatinine ratio |

*May be included in a comprehensive metabolic panel.
eGFR indicates estimated glomerular filtration rate.

# Hypertension-mediated Organ Damage

## HMOD Assessment

**ESSENTIAL**

- Serum creatinine
- eGFR
- Dipstick urine test
- ۱۲-lead ECG

**OPTIMAL**

- Brain
- Eyes
- Heart
- Kidneys
- Arteries

**Serial assessment of HMOD**

may help to determine efficacy of treatment

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# Causes of Secondary Hypertension With Clinical Indications

| **Common causes** |
| --- |
| Renal parenchymal disease |
| Renovascular disease |
| Primary aldosteronism |
| Obstructive sleep apnea |
| Drug or alcohol induced |
| **Uncommon causes** |
| Pheochromocytoma/paraganglioma |
| Cushing's syndrome |
| Hypothyroidism |
| Hyperthyroidism |
| Aortic coarctation (undiagnosed or repaired) |
| Primary hyperparathyroidism |
| Congenital adrenal hyperplasia |
| Mineralocorticoid excess syndromes other than primary aldosteronism |
| Acromegaly |

# Exacerbators & Inducers of Hypertension

| | |
|---|---|
| **Non Steroidal Anti-Inflammatory Drugs (NSAIDs)** | No difference or an increase of up to 3/1 mmHg with celecoxib<br>3/1 mmHg increase with non-selective NSAIDs<br>No increase in Blood Pressure with aspirin<br>NSAIDs can antagonize the effects of RAAS inhibitors and beta blockers |
| **Combined Oral Contraceptive Pill** | 6/3 mmHg increase with high doses of estrogen (>50 mcg of estrogen and 1-4 mcg progestin) |
| **Antidepressants** | 2/1 mmHg increase with SNRI (Selective Norepinephrine and Serotonin Reuptake Inhibitors)<br>Increased Odds Ratio of 3.19 of hypertension with Tricyclic antidepressant use<br>No increases in blood pressure with SSRI (Selective Serotonin Reuptake Inhibitors) |
| **Acetaminophen** | Increased relative risk of 1.34 of hypertension with almost daily acetaminophen use |
| **Other Medications** | Steroids<br>Anti retroviral therapy: inconsistent study findings for increased blood pressure<br>Sympathomimetics: pseudoephedrine, cocaine, amphetamines<br>Anti-migraine serotonergics<br>Recombinant human erythropoeitin<br>Calcineurin inhibitors<br>Anti-angiogenesis and kinase inhibitors<br>11 ß-hydroxysteroid dehydrogenase type 2 inhibitors |
| **Herbal and Other Substances**[44-45] | Alcohol, Ma-huang, Ginseng at high doses, Liquorice, St. John's Wort, Yohimbine |

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# Exacerbators & Inducers of Hypertension

**Most common medications that can increase BP**

- Non-selective or traditional NSAIDs
- Combined oral contraceptive pill
- Select anti depressant medications including tricyclic antidepressants and SNRIs
- Acetaminophen when used almost daily and for prolonged periods

# Exacerbators & Inducers of Hypertension

- The effect of Anti-retroviral therapy is unclear as studies demonstrate either no effect on BP or some increase.
  - Alcohol raises BP regardless of the type of alcoholic drink.
  - Limited evidence on herbal and other substances.
  - Ma Huang, Ginseng at high doses and St. John's Wort reported to increased BP.

# Non-pharmacological Treatment

- Healthy lifestyle choices can prevent or delay the onset of high BP and can reduce CV risk
  - Lifestyle modification is often the first line of antihypertensive treatment.
  - Modifications in lifestyle can also enhance the effects of antihypertensive treatment.

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# Non-pharmacological Treatment - Diet

- Reducing salt added when preparing foods and at the table. Avoid or limit consumption of high salt foods.
  - Eating a diet rich in whole grains, fruits, vegetables, poly-unsaturated fats and dairy products, such as DASH diet.
  - Reducing food high in sugar, saturated fat and trans fats.
  - Increasing intake of vegetables high in nitrates (leafy vegetables and beetroot). Other beneficial foods and nutrients include those high in magnesium, calcium and potassium (avocados, nuts, seeds, legumes and tofu).

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# Non-pharmacological Treatment - Diet

- Moderate consumption of healthy drinks (coffee, green and black tea, Karkadé (Hibiscus) tea, pomegranate juice, beetroot juice and cocoa.

- Moderation of alcohol consumption and avoidance of binge drinking.
- Reduce weight and avoid obesity.
- Be careful with complementary, alternative or traditional medicines – little/no evidence.

# Non-pharmacological Treatment - Lifestyle

- Smoking cessation. 
- Engage in regular moderate intensity aerobic and resistance exercise, 30 minutes on 5 – 7 days per week or HIIT (High Intensity Interval Training). 
- Reduce stress and introduce mindfulness. 
- Reduce exposure to air pollution and cold temperature.

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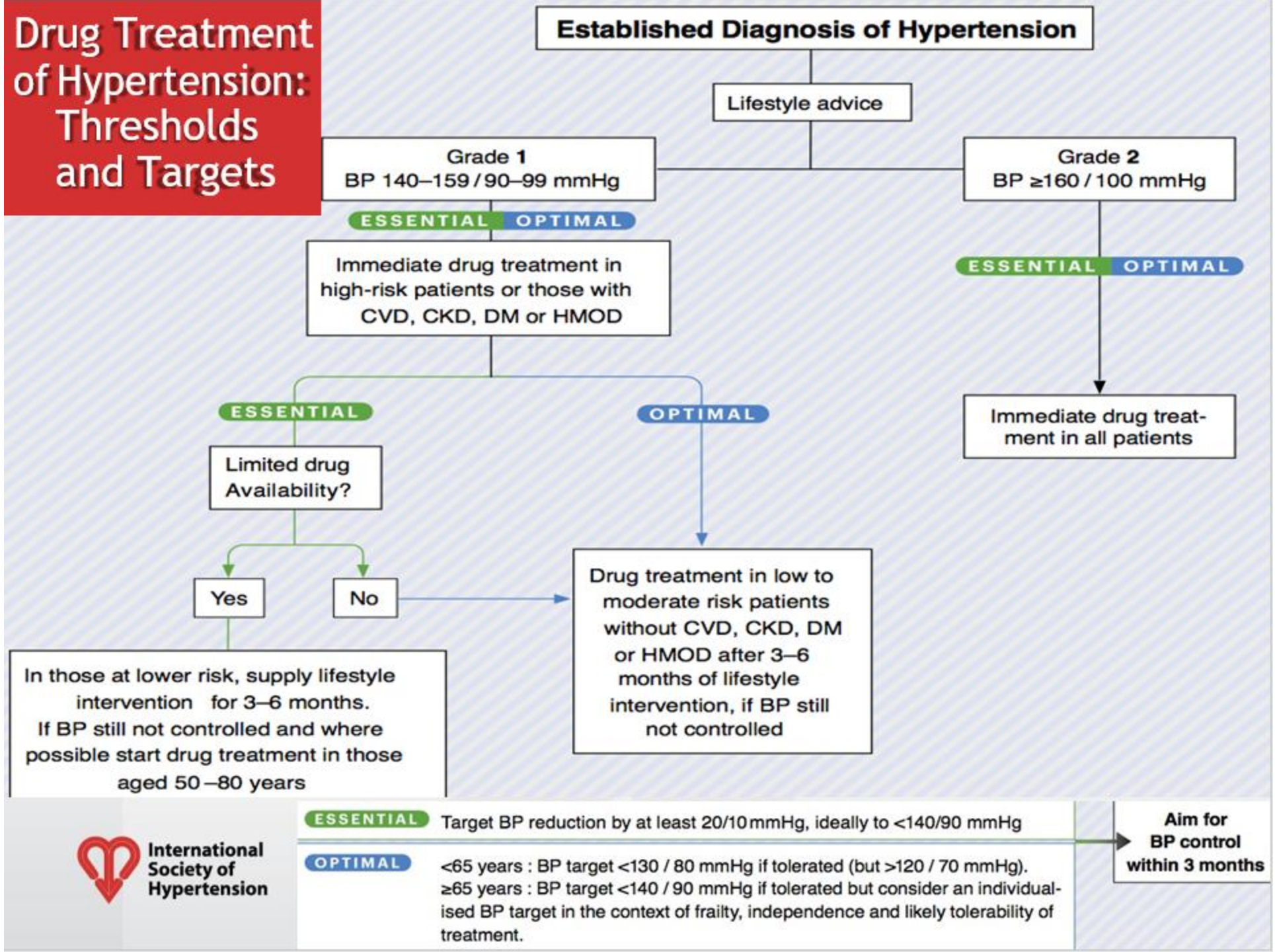
# Drug Treatment of Hypertension: Thresholds and Targets



# Drug Treatment of Hypertension

## Ideal Drug Characteristics

| | |
|---|---|
| ١, | Treatments should be evidence-based in relation to morbidity/mortality prevention. |
| ٢, | Use a once-daily regimen which provides 24-hour blood pressure control. |
| ٣, | Treatment should be affordable and/or cost-effective relative to other agents. |
| ٤, | Treatments should be well-tolerated. |
| ٥, | Evidence of benefits of use of the medication in populations to which it is to be applied. |

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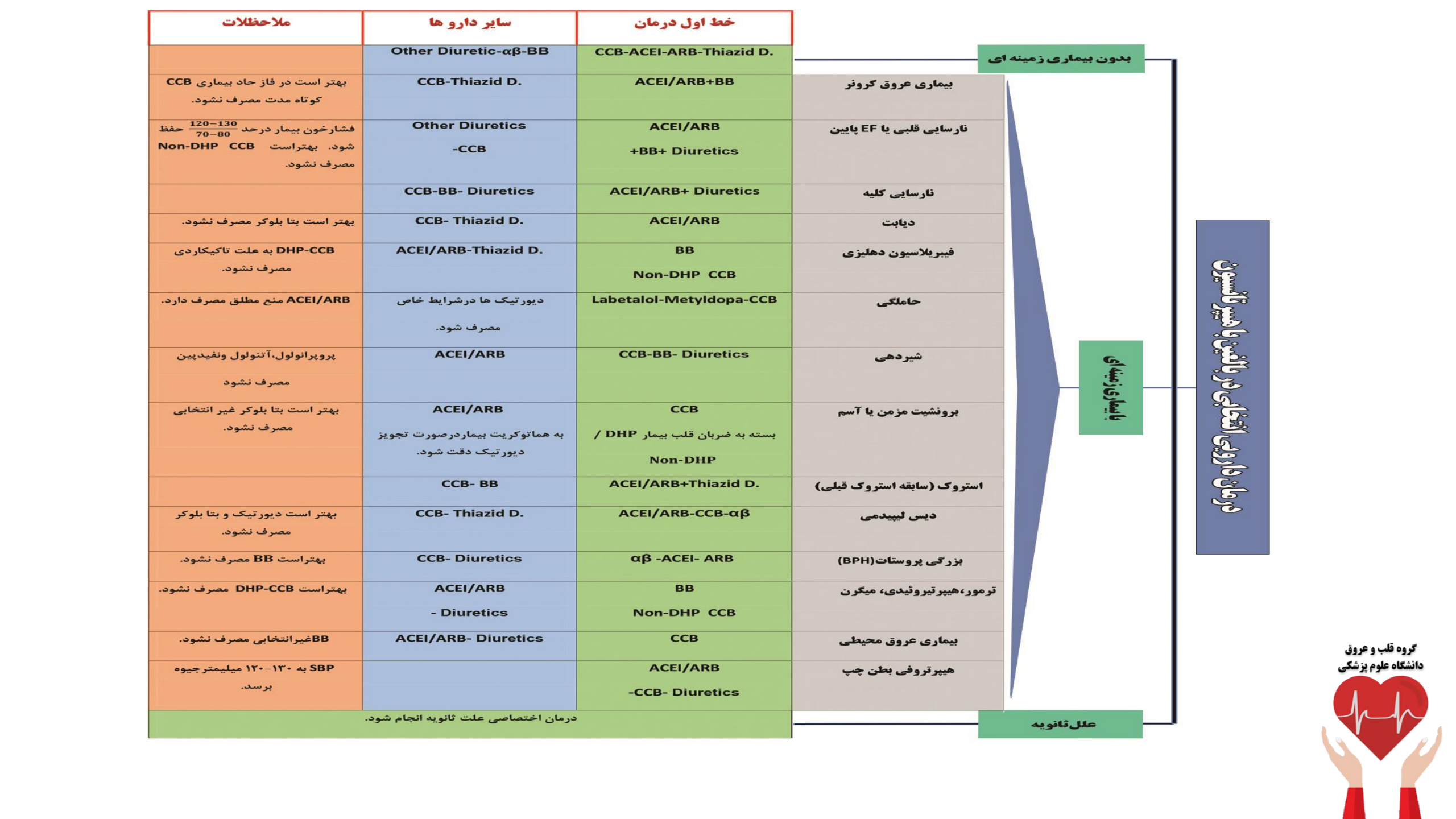


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| گروه دارویی | نام دارو | دوز معمول (mg) | دفعات مصرف در روز |
|---|---|---|---|
| Thiazid diuretics | Chlorthalidone | ۱۲,۵-۲۵ | ۱ |
| | Hydrochlorothiazide | ۲۵-۵۰ | ۱ |
| | Indapamide | ۱,۵-۲,۵ | ۱ |
| | Metolazone | ۲,۵-۱۰ | ۱ |
| ACEI | Captopril | ۱۲,۵-۱۵۰ | ۲ تا ۳ |
| | Enalapril | ۵-۴۰ | ۱ تا ۲ |
| | Lisinopril | ۱۰-۴۰ | ۱ |
| ARB | Losartan | ۵۰-۱۰۰ | ۱ تا ۲ |
| | Valsartan | ۸۰-۳۲۰ | ۱ |

| | | | |
|---|---|---|---|
| ۱ | ۲,۵-۱۰ | **Amlodipine** | **CCB-DHP** |
| ۱ | ۶۰-۱۲۰ | **Nifedipine LA** | |
| ۱ | ۱۲۰-۴۸۰ | **Diltiazem** | **CCB-Non DHP** |
| ۲ | ۱۸۰-۳۶۰ | **Diltiazem SR** | |
| ۳ | ۴۰-۸۰ | **Verapamil** | |
| ۱ تا ۲ | ۱۲۰-۴۸۰ | **Verapamil SR** | |
| ۱ | ۱۰۰-۴۸۰ | **Verapamil-delayed onset ER** | |
| ۲ | ۰,۵-۴ | **Bumetanide** | **Loop diuretics** |
| ۲ | ۲۰-۸۰ | **Furosemide** | |
| ۱ | ۲۵-۱۰۰ | **Spironolactone** | **Aldosterone antagonists** |
| ۲ | ۵۰-۱۰۰ | **Eplerenone** | |
| ۱ تا ۲ | ۵-۱۰ | **Amiloride** | **K sparing diuretics** |
| ۱ تا ۲ | ۵۰-۱۰۰ | **Triamterene** | |
| ۱ | ۱۵۰-۳۰۰ | **Aliskiren** | **Direct renin inhibitors** |

| | | | |
|---|---|---|---|
| Beta blockers cardioselective | Atenolol | ۲۵-۱۰۰ | ۱ تا ۲ |
| | Metoprolol tartrate | ۱۰۰-۴۰۰ | ۲ |
| | Metoprolol Succinate | ۵۰-۲۰۰ | ۱ |
| | Bisoprolol | ۲,۵-۱۰ | ۱ |
| Beta blockers Noncardioselective | Propranolol IR | ۱۶۰-۴۸۰ | ۲ |
| | Propranolol LA | ۸۰-۳۲۰ | ۱ |
| Beta blockers Combined alpha- and beta-receptor | Carvedilol | ۱۲,۵-۵۰ | ۲ |
| | Carvidilol phosphate | ۲۰-۸۰ | ۱ |
| | Labetalol | ۲۰۰-۸۰۰ | ۲ |
| Alpha blockers | Prazosin | ۲-۲۰ | ۲ تا ۳ |
| | Terazosin | ۱-۲۰ | ۱ تا ۲ |
| Central Alpha antagonists | Clonidine oral | ۰,۱-۰,۸ | ۲ |
| | Clonidine patch | ۰,۱-۰,۳ | هفتگی |
| | Methyldopa | ۲۵۰-۱۰۰۰ | ۲ |
| Direct vasodilators | Hydralazine Minoxidil | ۲۵-۲۰۰ | ۲ تا ۳ |

# Drug choice & Sequencing

## ESSENTIAL

- Use whatever drugs are available with as many of the ideal charac-teristics (see Pa6/e 9} as possible.
- Use free combinations if SPCs are not available or unaffordable
- Use thiazide diuretics if thiazide-like diuretics are not available
- Use alternative to DHP-CCBs if these are not available or not tolerated (i.e. Non-DHP-CCBs: diltiazem or verapamil).

## OPTIMAL

Ideally Single Pill Combination Therapy (SPC)

| | |
|---|---|
| **Step 1** Dual low-dose# combination | **A + C** [a, b, c] |
| **Step 2** Dual full-dose combination | A + C [^ b] |
| **Step 3** Triple combination | A -r C + D |
| Step 4 (Resistant Hypertension) Triple Combination + Spironolactone or other drug" | A + C +D **Add spironolactone** (1Z.5— 50 mg o.d.)[d] |

**ESSENTIAL and OPTIMAL**

Consider beta-blockers at any treatment step when there is a specific indication for their use, e.g. heart failure, angina, post-MI, atrial fibrillation, or younger women with,

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a) Consider monotherapy in low risk grade 1 hypenension or in very old (z8O yrs) or frailer patients.
b) Consider A + D in post-stroke, very elderly, incipient heart failure or CCB intoleranoe.
c) Consider A + C or C + D in black patients.
d) Caution with spironolactone or other potassium sparing diuretics when estimated GFR ٤٠ ml/min/١,٧Sm٢ or K* >4.٥ mmol/L.

**A** = ACE-Inhibitor or ARB (Angiotensin Reoeptor Blocker)
c = DHP-CCB (Dihydtopyridine -Calcium Channel Blocker)
D = Thiazide-like diuretic

- A 75 years old farmer was treated for hypertension. His medications are:
- Tab enalapril 20 mg bid
- Tab amlopress 5 mg daily
- His BP= 145/95
- What do you do?

a) Continue these drugs
b) Reduce these doses
c) Increse these doses
d) Change these drugs

- A 50 years old woman was treated for hypertension. Her medications are:
- Tab valsartan 80 mg bid
- Tab amlopress 5 mg daily
- Her BP= 130/90
- What do you do for optimal treatment?

a) Continue these drugs
b) Reduce these doses
c) Increse these doses
d) Change these drugs

# Drug Treatment of Hypertension

## Summary 1

In established hypertension, uncontrolled by lifestyle measures:

### Drug Treatment Threshold

≥140/90 mmHg (raising to ≥160/100 mmHg for those at lowest risk)

### Drug Treatment Target

OPTIMAL: Optimal:
<65 years: <130/80 mmHg
≥65 years: <140/90 mmHg

ESSENTIAL: reduce BP by ≥20/10 mmHg

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# Drug Treatment of Hypertension

## Summary 2

**OPTIMAL**

(i) Uptitration to target, of the following:
Low dose A+C → Full dose A+C → A+C+D → A+C+D + spironolactone

(ii) Consider other initial combinations for specific patient subgroups

(iii) Use SPC's where possible

(iv) Use thiazide-like diuretics preferentially

**ESSENTIAL**

- Where less ideal agents are available, focus on effective BP lowering (≥20/10 mmHg)

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# Comorbidities of Hypertension

| Additional co-morbidity | Recommended Drugs | Warning |
|---|---|---|
| **Rheumatic disorders** | • RAS-inhibitors and CCBs ± Diuretics<br>• Biologic drugs not affecting blood pressure should be preferred (where available) | High doses of NSAID's |
| **Psychiatric disorders** | • RAS-inhibitors and diuretics<br>• Beta-blockers (not metoprolol) if drug-induced tachycardia (antidepressant, antipsychotic drugs).<br>• Lipid-lowering drugs/Antidiabetic drugs according to risk profile | Avoid CCBs if orthostatic hypotension (SRI's) |

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- A 67 years old with RA and obesity uses these drugs:
- Tab valsartan 160 mg bid
- Tab amlodipin 5 mg bid
- Tab HCTZ 50 mg daily
- But his BP= 150/90
- What do you do first?

a) Increase these doses
b) Add aldactone
c) Consider pseudoresistant HTN
d) Add frousmide

- In last case, if you want add a drug, what do you do?

a) Add aldactone
b) Add frousmide
c) Add clonidine
d) Add prazocine

# Resistant Hypertension

- Suspect resistant hypertension if office BP >140/90 mmHg on treatment with at least 3 antihypertensives (in maximal or maximally tolerated doses) including a diuretic.

- Exclude pseudo-resistant hypertension (white-coat effect, non-adherence to treatment, incorrect BP measurements, errors in antihypertensive therapy) and substance-induced hypertension as contributors.

- Optimise health behaviours and lifestyle.

# Resistant Hypertension

- Consider changes in the diuretic-based treatment prior to adding the fourth antihypertensive medication.
- Add a low dose of spironolactone (if serum potassium is <4.5 mmol/L and eGFR is >45 ml/min/1.73 $m^2$).
- Consider amiloride, doxazosin, eplerenone, clonidine and beta-blockers as alternatives to spironolactone. If unavailable, consider any antihypertensive class not already in use.
- Optimally, consider referring to a specialist centre with sufficient expertise/resources.

- In which cases you are looking for secendary hypertension?

a) 55 year old man with type2 DM and k=6 in his lab data
b) 60 year old woman admitted with acute pulmonary edema with history of uncontrolled HTN
c) 50 years old man with history of anterior MI 2 years ago and k=2.5 in his lab data
d) Onset of HTN in 35 years old woman

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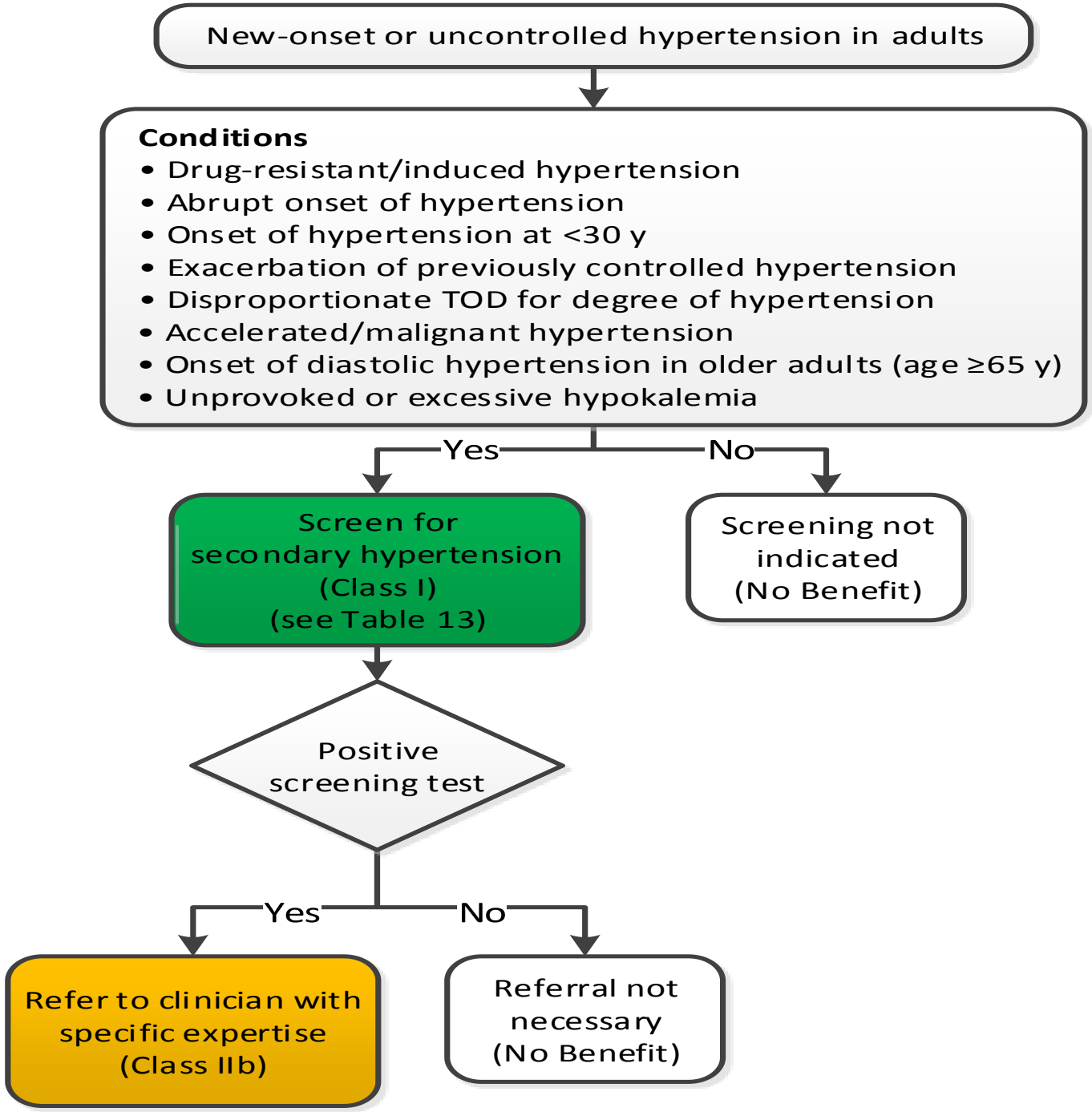

# Secondary Hypertension

- **Consider screening for secondary hypertension in:**
  early onset hypertension, resistant hypertension, sudden BP control deterioration, hypertensive urgencies and emergencies, high clinical probability of secondary hypertension.

- **Exclude:**
  pseudo-resistant hypertension and drug/substance-induced hypertension prior to investigations for secondary hypertension.

# Secondary Hypertension

ESSENTIAL

**Basic screening for secondary hypertension**

thorough history + physical examination (clinical clues) + basic blood biochemistry (including serum sodium, potassium, eGFR, TSH) + dipstick urine analysis.

OPTIMAL

Arrange other investigations for secondary hypertension (additional biochemistry/imaging/others) based on information from history, physical examination and basic clinical investigations and/or if feasible refer to a specialist centre

- A 40 years old 37 week pregnant woman has BP= 170/110
- She has no chest pain, no dyspnea, no headache
- What do you do?

a) Immediately hospitalization and IV labetalol
b) Immediately hospitalization and IV nitrogliycerine
c) Outpatient management and oral methyldopa and amlodipine
d) Outpatient management and oral methyldopa and metoral

# Hypertension in Pregnancy

- Affects 5-10% of pregnancies worldwide.
- Maternal risks include placental abruption, stroke and long term risk of cardiovascular disease.
- Fetal and newborn risks include fetal growth restriction, pre-term delivery, increased fetal and neonatal morbidity and mortality.

# Hypertension in Pregnancy

## Investigation of Hypertension in Pregnancy

**ESSENTIAL**

- Urinalysis, complete blood count, liver enzymes, serum uric acid and serum creatinine.
- Test for proteinuria in early and the second half of pregnancy. A positive urine dipstick should be followed with a spot UACR.

**OPTIMAL**

- Ultrasound of kidneys, doppler ultrasound of uterine arteries

# Hypertension in Pregnancy

## Prevention of Pre-eclampsia

In women at increased risk of pre-eclampsia:

- **Aspirin** (75-162 mg/day) and
- **Oral calcium** (1.5-2 g/day if low dietary intake)

- **Increased Risk:** 1st pregnancy >40 y age, pregnancy interval >10 y, BMI >35 kg/m$^2$, multiple pregnancy, chronic hypertension, diabetes, CKD, autoimmune disease, hypertension in previous pregnancy or family history of pre-eclampsia

# Hypertension in Pregnancy

## Management (1)

**Initiate Drug treatment** if BP persistently:

- >150/95 mmHg in all women
- >140/90 mmHg if gestational hypertension or subclinical HMOD

- **First Line Drug Therapy Options**

  Methyldopa, beta-blockers (labetalol), and Dihydropyridine-Calcium Channel Blockers (DHP-CCBs)

# Hypertension in Pregnancy

## Management (2)

**If SBP ≥170mmHg or DBP ≥110mmHg (Emergency):**

- **Immediately hospitalize**
- **Initiate IV labetalol** (alternative i.v. nicardipine, esmolol, hydralazine, urapidil), or oral methyldopa or DHP-CCBs)
- **Magnesium**
- **If pulmonary edema, IV nitroglycerin**

# Hypertension in Pregnancy

## Delivery in Gestational Hypertension or Pre-Eclampsia

- At 37 weeks if asymptomatic
- Expedite delivery in women with pre-eclampsia with visual disturbances or haemostatic disorders or HELLP syndrome.

## Post Partum

- ESSENTIAL Lifestyle adjustment
- OPTIMAL Lifestyle adjustment with annual BP checks




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- A 70 years old man with ICH and BP= 200/120
- What do you do?

a) Immediate lowering SBP< 120
b) Immediate lowering SBP< 180 but >130
c) Lowering BP in 1 hour, SBP<120
d) Lowering BP in 1 houre , _20% MAP

# HYPERTENSION CRISIS

It means SBP>=180 OR DBP>=120

HTN Emegency

HTN urgency

# Hypertensive Emergencies

## Assessment

ESSENTIAL

- Clinical exam: Evaluate for HMOD including fundoscopy
- Investigations: Hemoglobin, platelets, creatinine, sodium, potassium, lactate dehydrogenase, haptoglobin, urinalysis for protein, urine sediment, ECG.

# Hypertensive Emergencies

## Assessment

**OPTIMAL**

In addition, context specific testing:

- Troponins (chest pain or anginal equivalent)
- Chest x-ray (congestion/fluid overload)
- Transthoracic echocardiogram (cardiac structure and function)
- CT/MRI brain (cerebral hemorrhage/stroke)
- CT-angiography thorax/abdomen (acute aortic disease)

# Hypertensive Emergencies

## Management

- Requires immediate BP lowering to prevent or limit further HMOD
- Sparse evidence to guiding management – recommendations largely consensus based.
- Time to lower BP and magnitude of BP reduction depends on clinical context.
- IV Labetalol and nicardipine generally safe to use in all hypertensive emergencies

# Hypertensive Emergencies

| Clinical presentation | Timeline and target BP | 1st line treatment | Alternative |
|---|---|---|---|
| **Malignant hypertension with or without TMA or acute renal failure** | Several hours, MAP – 20 % to – 25 % | Labetalol<br>Nicardipine | Nitroprusside<br>Urapidil |
| **Hypertensive encephalopathy** | Immediate, MAP – 20 % to – 25 % | Labetalol<br>Nicardipine | Nitroprusside |
| **Acute ischemic stroke and BP > 220 mmHg systolic or >120 mmHg diastolic** | 1 h, MAP – 15 % | Labetalol<br>Nicardipine | Nitroprusside |
| **Acute ischemic stroke with indication for thrombolytic therapy and BP > 185 mmHg systolic or > 110 mmHg diastolic** | 1 h, MAP – 15 % | Labetalol<br>Nicardipine | Nitroprusside |
| **Acute hemorrhagic stroke and systolic BP >180 mmHg** | Immediate, systolic 130 < BP < 180 mmHg | Labetalol<br>Nicardipine | Urapidil |
| **Acute coronary event** | Immediate, systolic BP < 140 mmHg | Nitroglycerine<br>Labetalol | Urapidil |
| **Acute cardiogenic pulmonary edema** | Immediate, systolic BP <140 mmHg | Nitroprusside or Nitroglycerine (with loop diuretic) | Urapidi (with loop diuretic) |
| **Acute aortic disease** | Immediate, systolic BP <120 mmHg and heart rate <60 b.p.m. | Esmolol and Nitroprusside or Nitroglycerine or Nicardipine | Labetalol or Metoprolol |
| **Eclampsia and severe pre-eclampsia/HELLP** | Immediate, systolic BP < 160 mmHg and diastolic BP < 105 mmHg | Labetalol or Nicardipine and Magnesium sulphate | |

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# ACUTE HEMORRHAGIC STROKE

- Immediate lowering BP
- 180>SBP>130
- Labetalol, nicardipine

- A 50 years old man with ischemic stroke and BP= 190/120
- He is candidate for thrombolysis
- What do you do?

a) Immediate lowering SBP< 180
b) Immediate lowering BP, _15% MAP
c) Lowering BP in 1 hour, SBP<180
d) Lowering BP in 1 houre , _15% MAP

- A 60 years old man with acute ischemic stroke and BP= 200/130
- He is not candidate for thrombolysis
- What do you do?

a) Lowering BP in 6 houre , SBP<180 and DBP< 110
b) Immediate lowering BP, _15% MAP
c) Lowering BP in 6 houre , _15% MAP
d) Lowering BP in 1 houre , _15% MAP

# ACUTE ISCHEMIC STROKE

- Candidate for thrombolysis:

- SBP>185 or
- DBP>110

- Lowering BP in 1houre…15% MAP

- Labetalol, nicardipine

- Not candidate for thrombolysis

- SBP>220 or
- DBP>120

- Lowering BP in 1houre…15% MAP

- Labetalol, nicardipine

- A 60 years old man with confusion admitted, his BP= 190/110
- His brain CT is normal, there is normal neurologic examination
- What do you do?

a) Immediate lowering BP, _25% MAP
b) Immediate lowering BP, _15% MAP
c) Lowering BP in 1 hour, _25% MAP
d) Lowering BP in 6 houre , _25% MAP

# HYPERTENSIVE ENCEPHALOPATHY

Immediate lowering BP

20-25% MAP

Labetalol, nicardipine

- A 50 years old man with acute anterior MI and BP= 190/120
- What do you do?

a) Immediate lowering SBP< 180
b) Immediate lowering BP, _15% MAP
c) Lowering BP in 1 hour, SBP<180
d) Immediate lowering SBP< 140

# ACUTE CORONARY SYNDROME

- IMMEDIATE lowering BP< 140

- nitroprusside or NTG

- A 60 years old man with acute pulmonary edema and BP= 190/120
- What do you do?

a) Immediate lowering SBP< 180
b) Immediate lowering BP, _15% MAP
c) Lowering BP in 1 hour, SBP<180
d) Immediate lowering SBP< 140

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# ACUTE PULMONARY EDEMA

- IMMEDIATE lowering BP< 140

- nitroprusside or NTG( with loop diuretic)

- A 70 years old man with acute aortic dissection and BP= 190/120
- What do you do?

a) Immediate lowering SBP< 140
b) Immediate lowering BP, _15% MAP
c) Immediate lowering BP, _25% MAP
d) Immediate lowering SBP< 120

# ACUTE AORTIC DISSECTION

- IMMEDIATE lowering BP< 120 and HR< 60

- Esmolol and nitroprusside or NTG or nicardipine

- A 70 years old man with no end organ damage and BP= 190/120
- What do you do?

a) lowering BP in several hours, _25% MAP
b) lowering BP in 6 hours, _15% MAP
c) Lowering BP in 1 hour, _25% MAP
d) Lowering BP in 6 houre , _25% MAP

# NO END ORGAN DAMAGE

several hours

20-25% MAP

Labetalol, nicardipine