

Evidence Based Approach To High BP
(Student Led Seminar)
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Objectives

- **Pre test (MCQ's)**
- **Introduction**
- ✓ **Definition**
- ✓ **Epidemiology**
- ✓ **Complications**
- ✓ **Diagnosis and assessment**
- ✓ **CVD risks and Framingham score of assessment**
- **How to approach patients with HTN**
- **Clinical Cases**
- **Summary**
- **Post test (MCQ's)**
- **Role play**

MCQ's

- **Which of the following statements concerning the arterial blood pressure is correct?**
- **a)** is 120/80 mm Hg (16/10.6 kPa)
- **b)** Depends solely on the cardiac output.
- **c)** Is the arithmetic average of the systolic and diastolic pressures.
- **d)** Is due to the vascular resistance of the capillaries.

MCQ's

- Which of the following statements regarding hypertension are true?
- a) A systolic blood pressure of more than 130 mm Hg in a healthy young adult is normal.
- b) Grade 2 hypertension is characterized by a diastolic pressure of 100-109 mm Hg and a systolic pressure of 160-170 mm Hg.
- c) A blood pressure of 135/95 would be considered normal
- d) Hypertension seen in renal disease is classified as primary hypertension

MCQ's

- **What Anti-hypertensive drug is contraindicated in a dyslipidemic patient?**
- A) ACE inhibitors.
- B) B-blockers .
- C) Ca⁺ channel blockers.
- D) Diuretics.

MCQ's

- **What is the preferred drug to be used in Anti-hypertensive pregnant woman?**
- A) B-blockers
- B) ACE inhibitors
- C) ARB
- D) Methyldopa

MCQ's

- What the target BP for patient with type 2 diabetes assuming no co-morbidities?
- A) < 120/75 mmHg
- B) <130/80 mmHg
- C) <150/90 mmHg
- D) <140/80 mmHg

What is hypertension?



- HTN is defined as **persistent elevation of SBP \geq 140 mm Hg and/or DBP \geq 90 mm Hg** in adults not on antihypertensive medications.

Saudi Hypertension Management Society Guidelines (SHMS)

Epidemiology of Hypertension Globally

- Globally, the overall prevalence of raised blood pressure in adults aged 25 and over was around **40%** in 2008.
- In all WHO regions, **men have slightly higher** prevalence of raised blood pressure than women.
- The prevalence of raised blood pressure was highest in **Africa**, where it was 46% for both sexes combined.

Epidemiology of Hypertension Globally

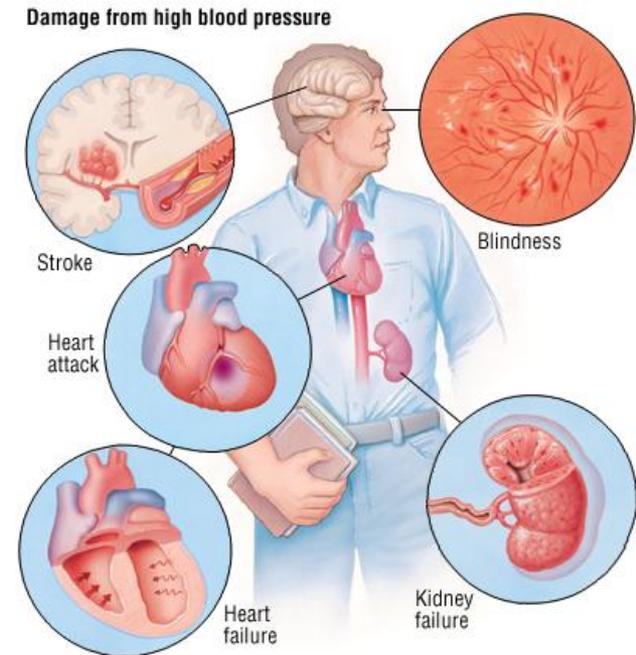
- *Uncontrolled hypertension* rose from 600 million in 1980 to almost 1 billion in 2008 due to two main reasons *population growth and ageing.*
- Worldwide, raised blood pressure is estimated to cause 7.5 million deaths , about **12.8%** of the total of all deaths.

Epidemiology in Saudi Arabia

- HTN affects more than **20%** of the adult Saudi population, with expected increasing prevalence.
- The prevalence of raised blood pressure in adults aged 25 and over was around **30%** in 2008.
- The prevalence of raised blood pressure in males and females was 32.9% and 28.7% respectively.
- **41.2% of hypertensive patient on medication.**
- *Saudi Hypertension Management Society Guidelines (SHMS)*
- *Global Health Observatory Data Repository*

Why do we have to control Bp ?

- **To prevent the complication (target organ damage) :**
- **Heart:**
 - Left ventricular hypertrophy
 - Angina
 - prior myocardial infarction
 - Heart failure
- **Brain:**
 - Stroke
 - transient ischemic attack
- **Chronic kidney disease**
- **Peripheral arterial disease**
- **Retinopathy**



What cause HTN ?

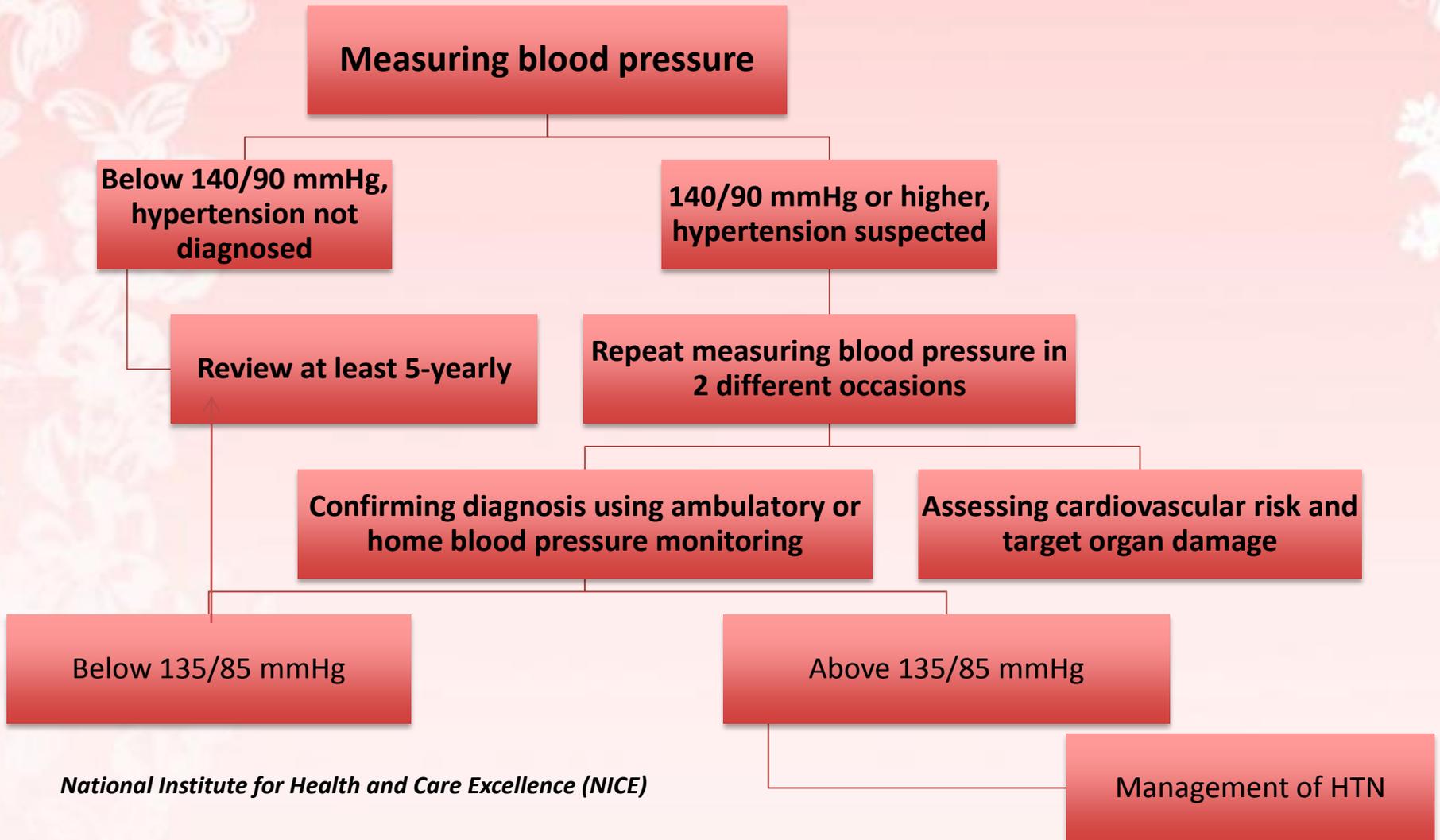
Primary

- **Idiopathic**

Secondary

- **Renoparenchymal disease**
- **Renovascular disease**
- **Primary hyperaldosteronism**
- **Cushing's syndrome**
- **Pheochromocytoma**
- **Thyroid or parathyroid disease**
- **Substance-induced** (oral contraceptives, NSAIDs, steroids, licorice, erythropoietin, cyclosporine, cocaine, amphetamines, excessive alcohol)
- **Coarctation of aorta**
- **OSA**

Diagnosis and assessment of hypertension



Risk Factors for Cardiovascular Diseases

Factors Influencing Prognosis

- ❖ Levels of SBP and DBP
- ❖ Men > 55 years of age * Women > 65 years of age
- ❖ Smoking
- ❖ Obesity
- ❖ **Dyslipidemia:** (LDL > 3.36 mmol/l [130 mg/dl])
(and/or HDL < 1.0 mmol/l [40 mg/dl])
- ❖ DM ***
- ❖ Family history of premature CVD***
- ❖ C-reactive protein > 1 mg/dl

Framingham risk score

- Patients estimate their 10-year risk cardiovascular risk for MI or coronary death >20% .
- <http://cvdrisk.nhlbi.nih.gov/>

Framingham risk score

Risk Assessment Tool for Estimating Your 10-year Risk of Having a Heart Attack

The risk assessment tool below uses information from the Framingham Heart Study to predict a person's chance of having a heart attack in the next 10 years. This tool is designed for adults aged 20 and older who do not have heart disease or diabetes. To find your risk score, enter your information in the calculator below.

Age:

years

Gender:

Female Male

Total Cholesterol:

mg/dL

HDL Cholesterol:

mg/dL

Smoker:

No Yes

Systolic Blood Pressure:

mm/Hg

Are you currently on any medication to treat high blood pressure.

No Yes

Calculate Your 10-Year Risk

How to approach a patient with Hypertension ?



Medical History

Physical Examination

Investigation

- **Routine Laboratory Tests**
- **Optional Tests**

Treatment

- **Non-Pharmacological Treatment**
- **Drug Treatment**

Case scenario

Fatimah is 38 years old. She is attending for a routine appointment about her contraception, for which she uses a diaphragm.

Medical History

- From her record you notice that Fatimah's blood pressure has increased since her last check 12 months ago.
- Social hx: She does not smoke
- PMHx, PSHx: no notable medical and surgical history.
- FHx : unremarkable.

On Examination

- Fatimah's initial blood pressure measurement is 158/94 mmHg. There is no notable difference between readings in both arms .
- Heart rate : 72 beats per minute and regular.
- BMI : 28.

What would you do next?!



Case continued

- You would take Fatimah's blood pressure a **third time during the consultation.**
- The third reading is 149/93 mmHg.
- **Fatimah is considered stage 1 HTN.**

Classification of Hypertension

Based on the most recent evidence, BP levels may be classified as follows:

Category	SBP (mm Hg)		DBP (mm Hg)
Normal	< 120	and	< 80
Pre-HTN	120–139	and/or	80–89
HTN: Grade I	140–159	And/or	90–99
HTN: Grade II	160–179	and/or	100–109
HTN: Grade III	≥ 180	And/or	≥ 110

Table 1. Classification of Blood Pressure Levels in Adults
Saudi Hypertension Management Society Guidelines (SHMS)

How to measure BP?

- Sit the patient for **10 minutes** at the office then take his **initial** BP reading, at the **end** of the visit take another BP reading and take the **average** of both reading.
- **Repeat this in two different occasions at least.**

**You suspect Hypertension,
what would you do next?!**



Case continued

- You organize for Fatimah to receive ambulatory blood pressure monitoring (ABPM) through your GP practice.
- You ensure that at least two measurements per hour are taken during Fatimah's usual waking hours (for example, between 8 am and 10 pm).
- You would use the average value of at least 14 measurements taken during Fatimah's usual waking hours to confirm a diagnosis of hypertension.



***Ambulatory blood pressure monitoring
(ABPM)***

Routine investigations

Carry out investigations **for target organ damage**

1. **Urine sample**

- for estimation of the albumin:creatinine ratio
- presence of protein in the urine
- test for **haematuria**.

2. **Blood sample** to measure plasma glucose, electrolytes, creatinine Uric Acid and Calcium, estimated glomerular filtration rate, Lipid Profile (total cholesterol , Trig, LDL and HDL)

3. Examine the **fundi**

4. Perform **Electrocardiograph**.

5. Identify and assess Fatimah's **CVD risk in Lipid modification**.

Optional tests

- 24-hour Urinary Protein
- Creatinine Clearance
- Echocardiography
- Ultrasonography
- Thyroid Stimulating Hormone
- 24-hour Urinary Vanil Mandelic Acid
- 24-hour Urinary Catechleamines
- 24-hour Urinary Free Hydrocortisol

Summary of case

Age → <55 Y/O

Risk factors → nil

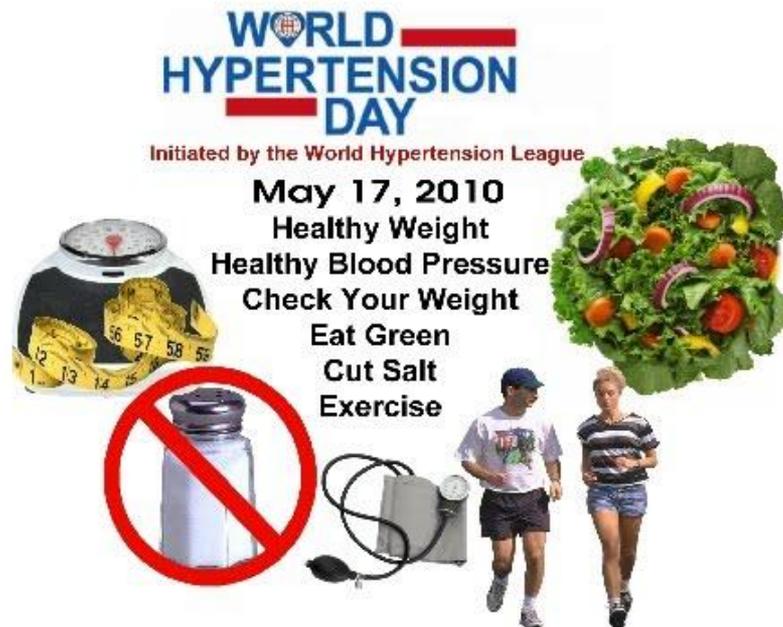
FHx → unremarkable

BP → ↑ in 3 different occasions

confirmed stage 1 HTN.

How would you manage this patient?

- **Management :**
 - Non-Pharmacological treatment.



If Fatimah had been eligible to receive antihypertensive drug treatment, what should you consider when prescribing antihypertensive drugs for a woman of child-bearing potential?

- A) ACE inhibitors.
- B) Angiotension receptor blockers .
- C) Ca⁺ channel blockers.
- D) Diuretics.

Table 5. Antihypertensive Medications—Indications and Contraindications

<i>Drug Class</i>	<i>Conditions Favoring the Use</i>	<i>Contraindications</i>	
		<i>Compelling</i>	<i>Possible</i>
<i>THZ-Ds</i>	CHF; Elderly Hypertensives; IS-HTN; Osteoporosis; Hypertensive patients of African origin	Gout; Hyponatremia	Dyslipidemia; Sexually Active Males; Pregnancy ; Young Patient with Risk of Developing DM
<i>DHP CCBs</i>	Elderly Patients; Angina; PAD; Pregnancy		Atrio-Ventricular Block (Grade 2 or 3); CHF; Tachyarrhythmias
<i>ACE-Is</i>	CHF; LV Dysfunction; Post-MI; DM; CKD	Pregnancy ; Hyperkalemia; Bilateral Renal Artery Stenosis; Angioedema	
<i>ARBs</i>	CHF; LV Dysfunction; Post-MI; DM; CKD	Pregnancy ; Hyperkalemia; Bilateral Renal Artery Stenosis	

What drug would be Absolute contraindicated in Fatimah's case?

- A) ACE inhibitors.
- B) B-blockers .
- C) Ca⁺ channel blockers.
- D) Diuretics.

- Hussah is an 81-year-old female non-smoker. She was diagnosed with stage 2 hypertension 1 month ago. Her clinic blood pressure was **174/100 mmHg**. She has now returned for a follow up appointment.
- Started treatment with a **calcium-channel blocker**.
- **Medical history:** No significant medical history

Investigations

- **Total cholesterol** :4.8mmol/L (normal < 5.2)
- **HDL** :1.6mmol/L (normal 1-1.5)
- Glucose is normal.
- No left ventricular hypertrophy or atrial fibrillation on ECG.
- Her 10-year cardiovascular risk is greater than 20%.

- Hussah's blood pressure is **not controlled.**
- We have to check if she's adhering to her drug
- If yes You would offer step 2 hypertensive treatment with the addition of an ACE or ARB inhibitor.

- Hussah's returns to the clinic one month later. Her clinic blood pressure is 154/90 mmHg and her blood results are acceptable.

- **What would you do next?**

1. You would review hussah's antihypertensive medication and ensure that it is at the optimal or best tolerated dose.
2. You would also consider her adherence to the drug regimen and ensure that any factors that may reduce her adherence are managed.

- At her next clinic appointment hussah's blood pressure is 145/85 mmHg. This is an acceptable blood pressure for a person over 80.
- Hussah can stay on current treatment.

Case scenario

Ahmed 55 year old man, who is a known case of diabetes on insulin. He came for routine follow up.

On Examination

V/S : **BP**:60 / 100 **Wt.**86 kg **Ht.** 168 cm

O/E:

- reduced sensation to pin pricks in lower Limb up to the middle of his legs.
- Funduscopy: background retinopathy
- No other significant findings.

Investigation

- 24hr urine for protein : 840 mg (<80 MG)
- urea : 9.4 mmol/L (2.5 – 6.4)
- creatinine: 142 mmol/L (62 – 115)
- sodium : 142 mmol/L (135 – 145)
- potassium : 4.8 mmol/L (3.5 – 5.1)
- Fasting Labs: TC = 180 mg/dL (<200 mg/dl)
- HDL-C = 39 mg/dL (<40 men, <50 women)
- LDL-C = 95 mg/dL (<100 mg/dl)
- TGs = 180 mg/dL (<150 mg/dl)
- **ECG** : LVH

Summary of case

- Levels of BP 160/110
- Male > 55 years of age
- DM → Since he is diabetic he is in high risk to develop cardiac disease within 10 years
- Renal damage

How are you going to manage this patient?

Medications:

- **Simvastatin 40 mg daily at bedtime**
- **Aspirin 81 mg daily**
- **Lisinopril 10 mg daily**
- **Hydrochlorothiazide 25 mg daily**

Case scenario

Radiyah is a **32 Y/O Ethiopian woman**, come to work as a maid, she presented to your clinic for a general check up.

PMHx: non remarkable.

PSH: non remarkable.

FHx: non remarkable.

On examination

- BMI = 21
- BP = 160/90 mmHg
- HR = 95 /min
- RR = 12
- Temp. = 37.5

How would you manage this patient?



1- Non-pharmacological Tx

- DASH diet and Lifestyle modification

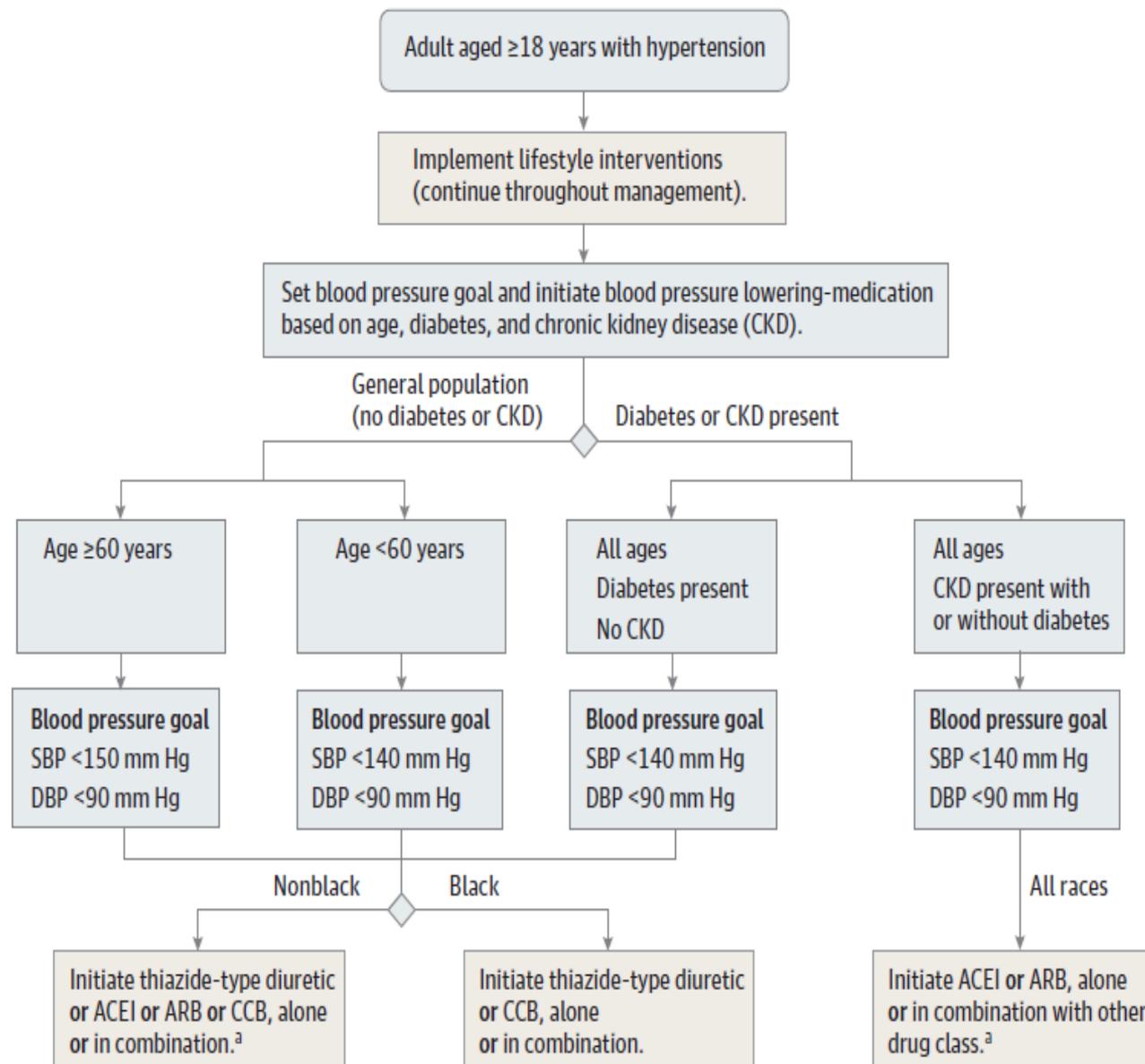
2- Pharmacological Tx

- Initiate with Thiazide Diuretics.
- Add on Ca⁺ channel blockers.

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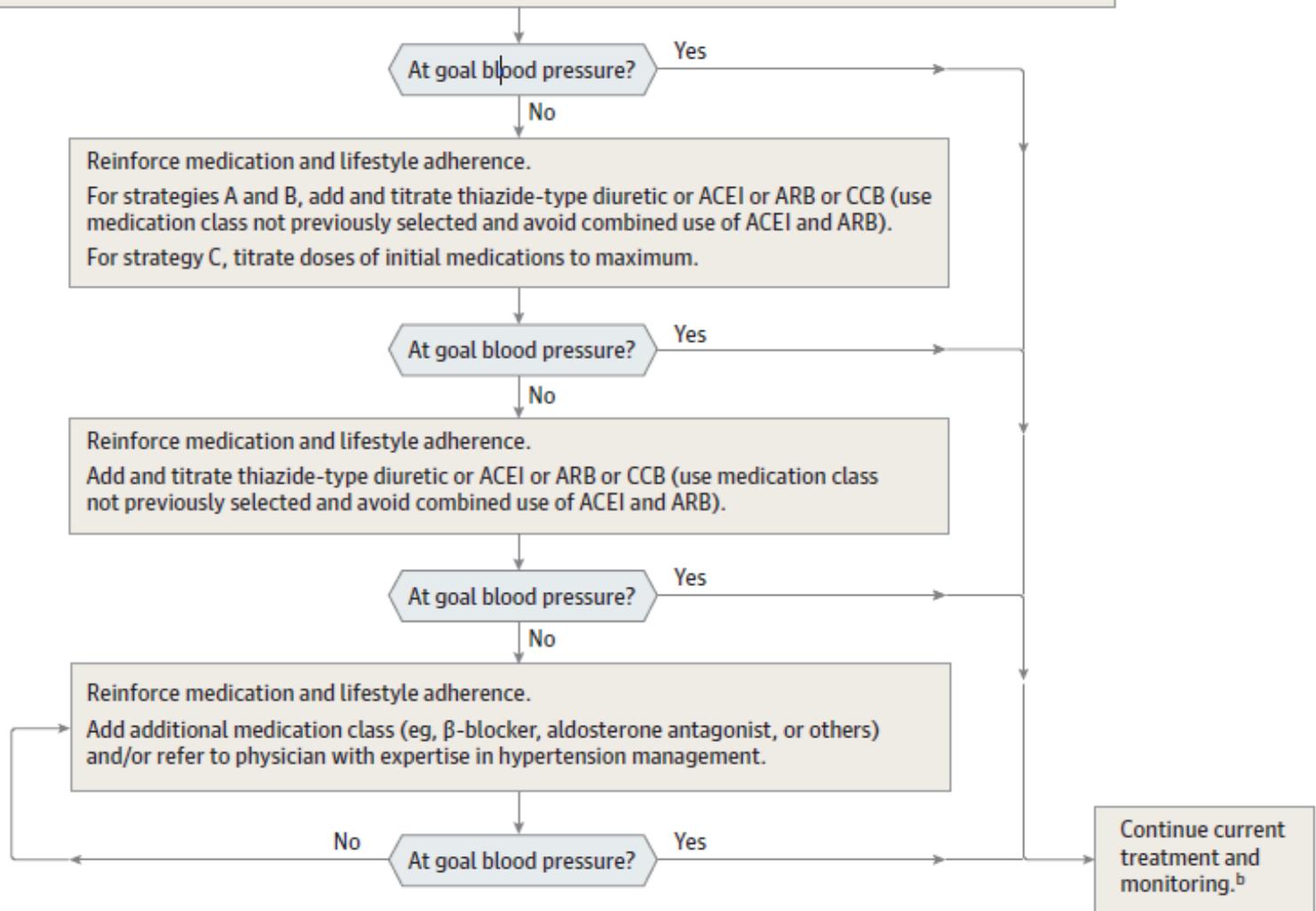
Summary :

Figure. 2014 Hypertension Guideline Management Algorithm

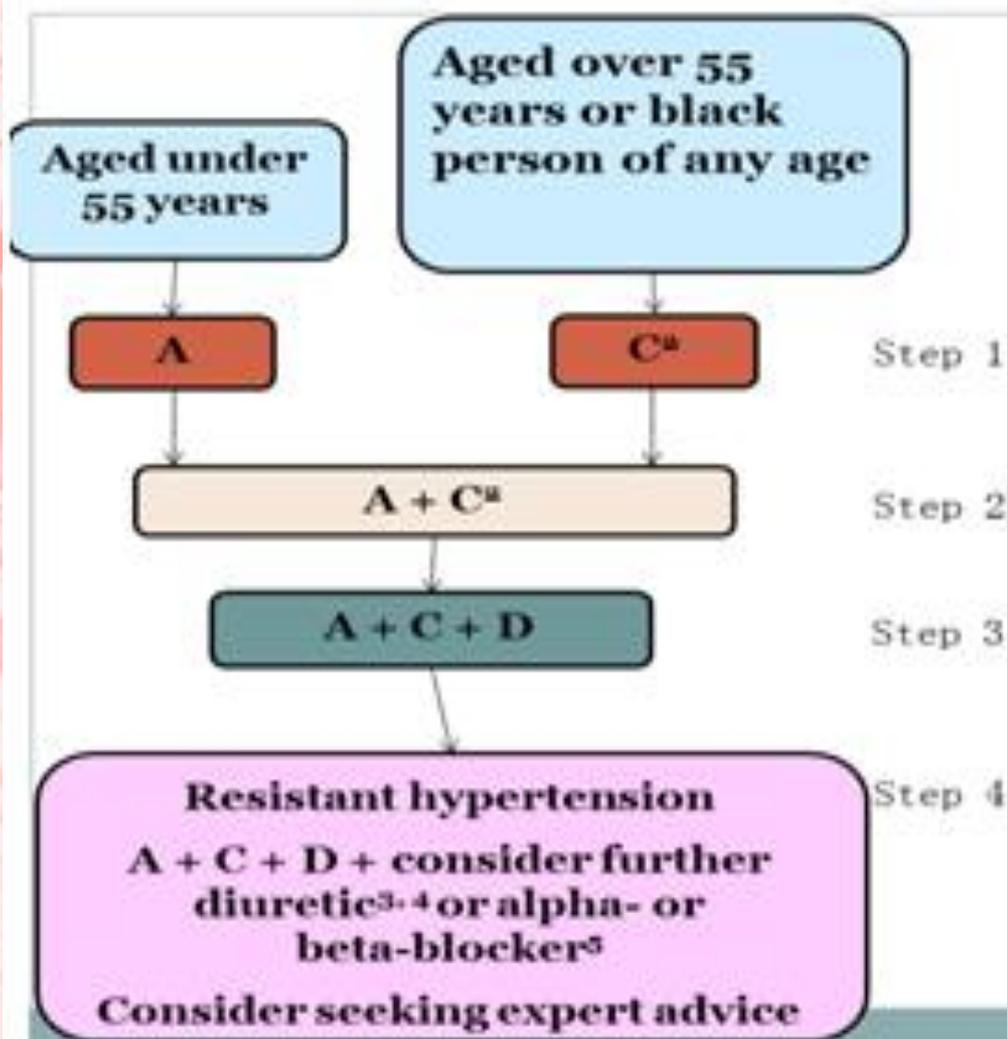


Select a drug treatment titration strategy

- A. Maximize first medication before adding second or
- B. Add second medication before reaching maximum dose of first medication or
- C. Start with 2 medication classes separately or as fixed-dose combination.



NICE 2011



Key

A – ACE inhibitor or low-cost angiotensin II receptor blocker (ARB)¹

C – Calcium-channel blocker (CCB)

D – Thiazide-like diuretic

Table 4. Management Strategy According to CV Risk Stratification

<i>Other RFs and Disease History</i>	<i>Blood Pressure (mm Hg)</i>			
	<i>Pre-HTN SBP 120–139 or DBP 80–89</i>	<i>HTN Grade I SBP 140–159 or DBP 90–99</i>	<i>HTN Grade II SBP 160–179 or DBP 100–109</i>	<i>HTN Grade III SBP > 180 or DBP > 110</i>
<i>No other RFs</i>	Assure healthy life style	LSM for several months, then drug treatment if BP uncontrolled	LSM for several weeks, then drug treatment if BP uncontrolled	Immediate drug treatment and LSM
<i>1–2 RFs, except DM</i>	LSM	LSM for several weeks, then drug treatment if BP uncontrolled	LSM for several weeks, then drug treatment if BP uncontrolled	Immediate drug treatment and LSM
<i>3 or more RFs–MetSyn, TOD, or DM</i>	LSM, EXCEPT when BP is 130–140/80–90: Add drug treatment	Drug treatment and LSM	Drug treatment and LSM	Immediate drug treatment and LSM
<i>CVRD</i>	Drug treatment and LSM	Immediate drug treatment and LSM	Immediate drug treatment and LSM	Immediate drug treatment and LSM

MCQ's

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The End

THANK YOU

References :

- **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)**
- **The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) 2003**
- **Saudi Hypertension Management Society Guidelines 2011**
- **NICE clinical guidelines : Hypertension: Clinical management of primary hypertension in adults , 2011**