Hypertension and Dyslipidemia

26/OCT/2022

الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

Objectives:

- Risk factors, screening and proper blood pressure measurement procedures.
- Approach (history, Physical exam and investigations), diagnosis and stages of hypertension.
- White Coat Hypertension
- Management, treatment goals and follow up.

CASE

Ahmed is an 18 years old obese man, came for routine health maintenance. He has no complains except that his mother is concerned for his increase weight gain for the past year. He always eats junk food and never sticks to a healthy diet. Recently he has not been able to join the school soccer team because of difficulties breathing while running.

On further Discussions, He stated that his father has been suffering from cardiovascular disease for the past 10 years.

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What Are The Risk Factors Associated With Hypertension?

- Age
- Type 1 or 2 diabetes
- Unhealthy diet
- Physical inactivity
- Obesity
- Sleep apnoea
- Excessive alcohol intake
- Tobacco
- Race or ethnicity (Black people are more prone to high blood pressure)

BOX 1 : cardiovascular Risk factors

- Age (men >55 years; women >65 years), smoking, obesity, dyslipidemia, diabetes, prediabetes, family history of premature CVD(men aged <55 years; women aged <65 years)

- Target Organ damage: LVH, Atherosclerosis, CKD, (CKD stage1-3,ÄCR 30-300mg/g.),,

- Associated clinical conditions: CVA, IHD,HF, (CKD4-5 or ACR>300mg/g), PVD, Advanced hypertensive retinopathy.

What Are The Relevant Screening Modality For This Patient?

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Screening

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According to the USPSTF (2021), ACC/AHA (2017), and ESC/ESH (2018) recommendations, adults 18 years or older, without known hypertension, should be screened for hypertension using office blood pressure measurement.

When to screen

- Adults 18 years or older normal BP should be screened once a year
- Adults at risk for hypertension (such as obesity) or a previously measured systolic blood pressure of 120 to 129 should be screened at least twice a year.

Was this helpful?

4 Yes 1 No

What Are The Key Elements that We Should Keep In Mind Regarding Office Blood Pressure Assessment?

- Avoid caffeine, exercise, smoking at least 30 minutes before the visit
- Relax, feet on floor with back supported for at least five minutes
- Empty bladder
- Refrain from talking during the rest period and measurement
- Remove all clothing covering the area where the cuff will be placed

What Are The Key Elements That We Should Keep In Mind Regarding Office Blood Pressure Assessment?

- Use the correct cuff size and Support the patient’s arm
- Position the middle of the cuff at the level of the heart
- Repeated measurements by one to two minutes
- Average of at least two measurements

How Can We Reach A Diagnosis Of Hypertension?

Diagnostic Criteria

The best diagnostic procedure for hypertension (gold standard) is 24-hour ambulatory blood pressure monitoring (ABPM). Home BP or ABPM is important in diagnosing hypertension; routine measures taken in the hospital environment should only be used for screening purposes.

The 2017 ACC/AHA recommendations propose using ABPM to diagnose hypertension. Satisfying one or more of the requirements below counts as evidence of hypertension:

- Mean SBP >125 mmHg and mean DBP >75 mmHg for 24-hours.
- Mean SBP >130 mmHg and mean DBP > 80 mmHg during the morning when awake.
- Mean SBP > 110 mmHg and mean DBP > 65 mmHg during the night when asleep.

The most important of these descriptions is the midday average of 130 mmHg systolic or 80 mmHg diastolic. Blood pressure levels taken at home are far closer to the effects of daytime ambulatory measurements than blood pressure readings taken in the doctor's office.

- Whitecoat hypertension – BP that is regularly elevated on office readings but without evidence of hypertension on measurements performed outside of the office.
- Masked hypertension – Blood pressure that is regularly elevated on measurements performed outside of the office but does not fulfill the requirements for hypertension based on hospital or clinic measurements.

"Home Blood Pressure measurement, using validated device is highly Recommended"

When Do We Need To Consider Secondary Causes of HTN? And What Are They?

Secondary causes Should be considered in patients 30 years or younger.

- Medicines and OTC drugs
- Illegal drugs use
- Primary renal disease
- Primary aldosteronism
- Fibromuscular dysplasia
- Sleep apnea (obstructive)
- Pheochromocytoma (rare)
- Cushing's syndrome
- Endocrine disorders
- Coarctation of the aorta in young children.

❖(Review Details of Secondary Causes of Hypertension: The Essentials, Chapter 1 HTN, Etiology)

CASE

A 58-year-old woman returns to clinic, and her BP is 150/85. Although her BP is consistently high in clinic, ambulatory readings taken at the fire station, drug store and at home average 130/82. She is not currently taking the medications you prescribed for hypertension, because she does not feel they are necessary.

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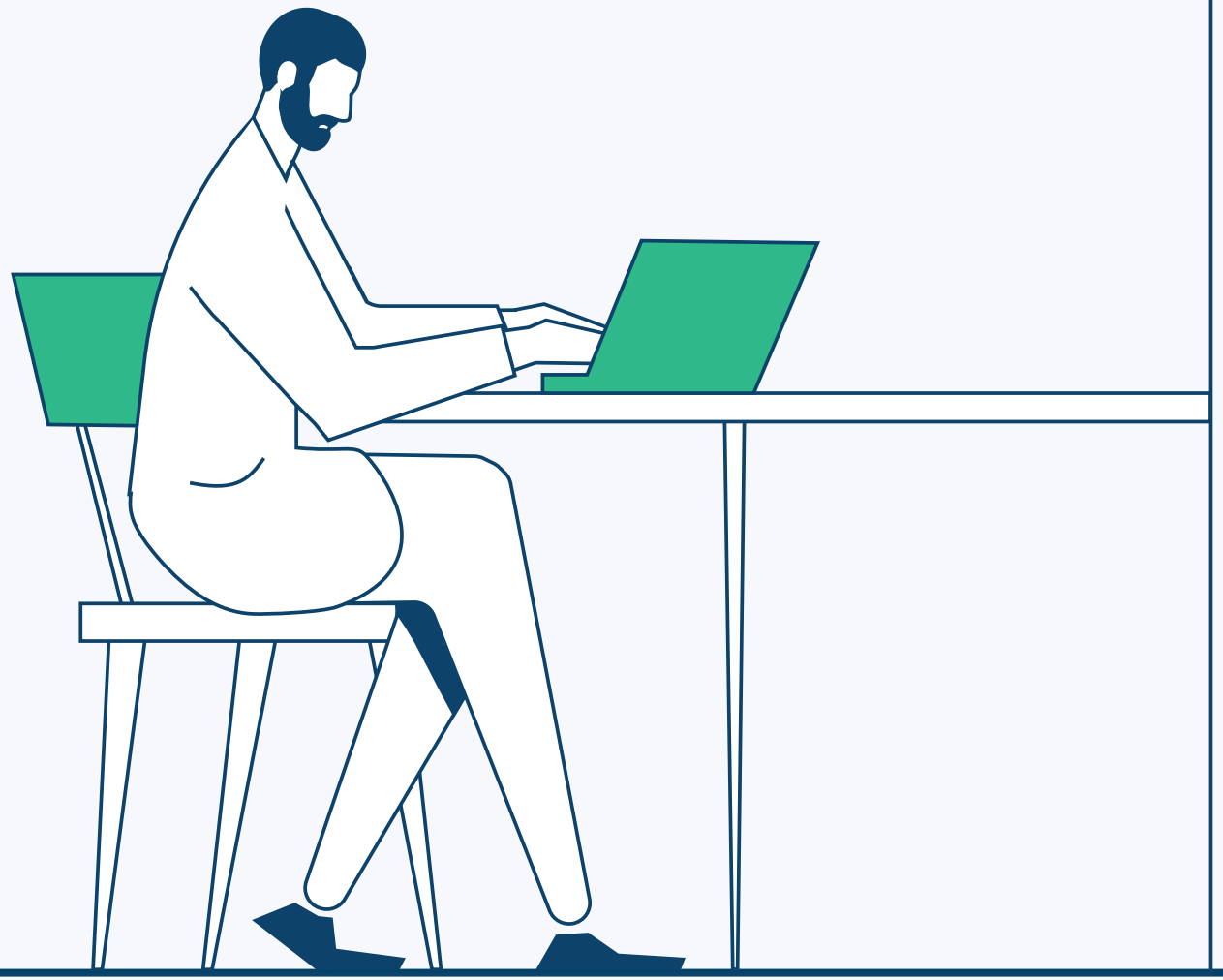


How Do You Reach A Definitive Diagnosis?

- 24 hours ambulatory blood pressure monitoring.

What Is The Ambulatory Blood Pressure Monitoring?

- It is performed by a validated automated device over a period of 24 hours.
- BP is measured at repeated intervals (every 15–30 mins while awake, and every 30–60 mins during sleep).
- The patient is instructed to engage in normal activities but to refrain from strenuous exercise and, at the time of cuff inflation, to stop moving and talking and keep the arm still with the cuff at heart level.
- At least 70% of BPs during daytime and night time periods should be satisfactory.

Non-Dippers Significance

- ABPM is a more sensitive risk predictor of CV outcome than is office BPM.
- The incidence of CV events is higher in non-dippers.

Possible reasons for the absence of dipping are:

1. sleep disturbance
2. obstructive sleep apnea (OSA)
3. Chronic Kidney Disease
4 obesity

12/16/2020 Male
8:40:05am 60yrs

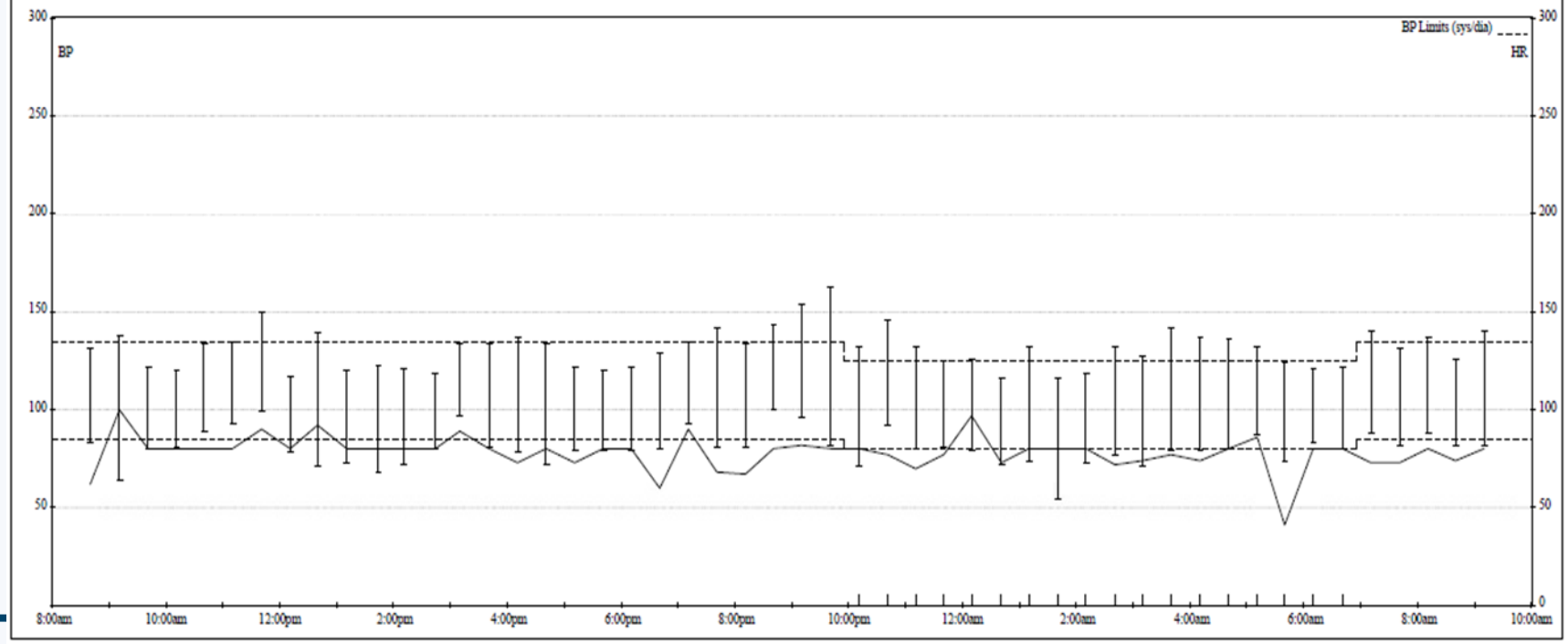
Measurement Results: Statistics Summary from
8:40am until 9:11am (2nd day)
50 Blood Pressure Measurement(s)
Statistics Intervals from Ambulatory BP Device : Yes
Total Rec. Time : 24:31 h
Duration Day Time : 15:31 h
Duration Night Time : 9:00 h
Measuring Method : oscillometric
24h Average sys/dia [mmHg] : 131.2 / 80.3

Day Time
Valid measurements: 32 of 32 [%] : 100
Syst. BP readings above 135 mmHg [%] : 34.3
Diast. BP readings above 85 mmHg [%] : 28.1

Night/Wake-up Time
Valid measurements: 18 of 18 [%] : 100
Syst. BP readings above 125 mmHg [%] : 61.1
Diast. BP readings above 80 mmHg [%] : 22.2

Day-Time Average sys/dia [mmHg] : 132.7 / 82.2
Night-Time Average sys/dia [mmHg] : 128.7 / 77.0
Diff.Day/Night Avg. sys/dia [%] : -3.0 / -6.3

Interpretation:



GE CardioSoft V6.73(21) Unconfirmed

What Is White Coat Hypertension?

BP that is regularly elevated on office readings but without evidence of hypertension on measurements performed outside of the office.

How Common Is “White Coat Hypertension”?

- 15-30% of patient with high blood pressure readings have white coat hypertension.

CASE

Mr. Ahmed a 48 years old man presents to your office for a follow up visit. He was seen one month back for an eczema and noted incidentally to have blood pressure measurement of 142/85. He feels fine and has no complains. His review of systems in negative. He is a nonsmoker, doesn't drink alcohol and doesn't exercise regularly. He has no previous history of MI, Stroke, or eye problems. Past surgical was only positive for Appendectomy at the age of 17 years old. He is on regular antihistamines for allergic rhinitis and no other medications He is married and has two daughters. Works in a local advertising company.

03

CASE

His father died of stroke at the age of 52 years. His mother is alive and has Diabetes on regular insulin at the age of 76 years. He has two siblings and has no chronic illness. In the clinic today his Blood pressure was:

- BP: 150/ 80
- Pulse: 78 beats/min
- Respiratory Rate: 15 breaths/min
- Afebrile

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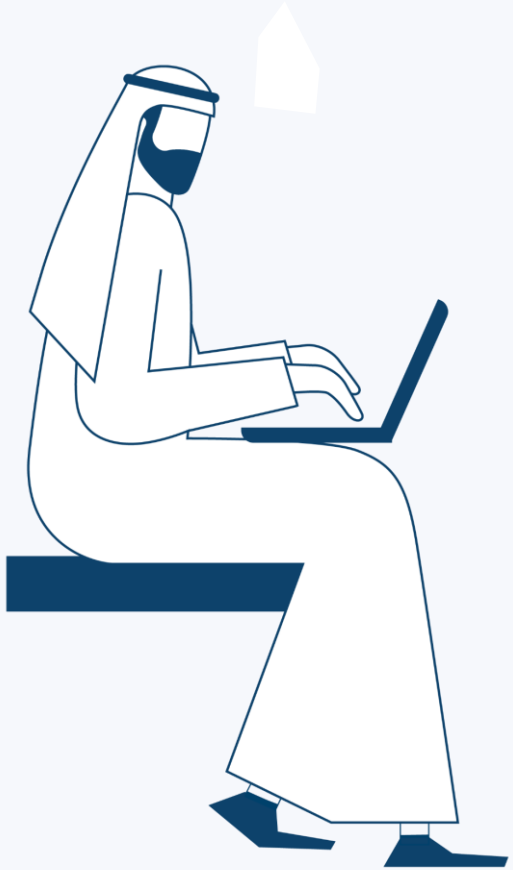
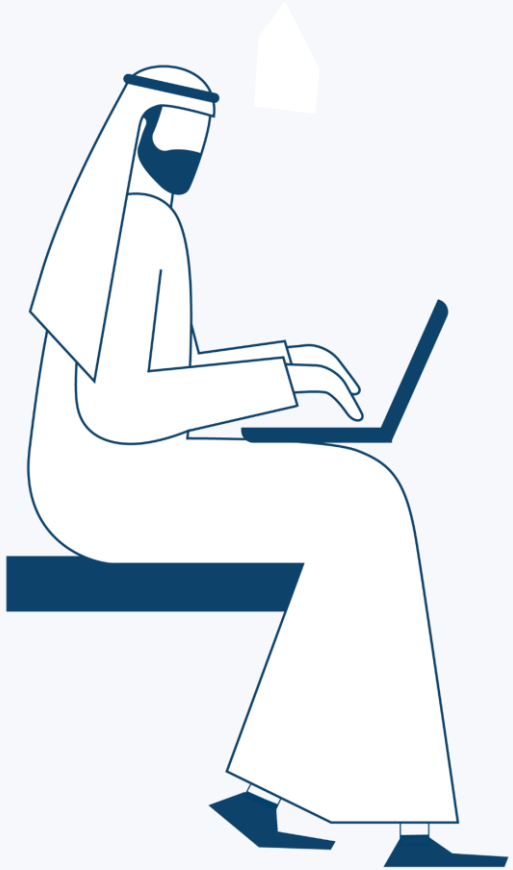
What Is The Most Important Points In The History Taking?



1- Information about end organ damage

- Heart: Ventricle hypertrophy (left), chest pain, angina pectoris, past MI, past coronary artery revascularization, heart failure
- Brain: haemorrhage, stroke, ischemic conditions (TIA), memory loss
- Chronic renal disease
- Peripheral artery disease
- Pathology of the retina
- Evaluation of heart disease risk level

What Is The Most Important Points In The History Taking?



2- Exclusion of secondary causes of hypertension
   (e.g., prescription drugs, over-the-counter NSAIDs, alcohol intake)
3- Duration of hypertension
4- Prior treatment attempts

What Initial Assessment Should Be Done For This Patient?

- Fundoscopic eye examination: to detect any symptoms of early or late, chronic, or acute hypertensive retinopathy. (e.g., retinal haemorrhages, microaneurysms, cotton-wool spots)
- Evaluate all peripheral pulses: Weak or absent femoral artery pulse may be a sign of coarctation of the aorta or severe peripheral vascular disease.

What Initial Assessment Should Be Done For This Patient?

- Neck examination: distension of jugular veins, carotid bruits, or enlarged thyroid gland.
- Abdominal Exam: Bruit of the renal artery may be felt in the upper abdomen. If present, in both systole and diastole, it represents stenotic renal arteries.
- Cardiac examination: to evaluate for symptoms of LVH

What Are The Investigations Needed By This Patient?

- Electrolytes and blood creatinine (for measuring the GFR)
- Fasting blood glucose
- Urinalysis
- CBC
- TSH
- Lipid profile
- ECG
- CVS risk calculations by Framingham Risk score

1- Nonpharmacological Management Includes:

- Nutritional salt
- Potassium intake
- Losing weight.
- DASH diet
- Exercise three to four sessions per week of moderate-intensity aerobic exercise lasting around 40 minutes over 12 weeks.
- Alcohol limitations

What Is the First Line Of Management In This Patient?

Lifestyle therapy for 3-6 months for stage 1 is recommended before starting medication.

Box6: Life style modifications:

Intervention	Effect on BP
Weight loss/ Healthy diet ,alcohol restriction	1 mm Hg for every 1-kg reduction in body weight
Low sodium intake (<1500 mg/d)	-5/6 mm Hg
More potassium (3500–5000 mg/d)	-4/5 mm Hg
Physical activity (150 min/week of moderate to high intensity) (Avoid if BP very High)	-5/8 mm Hg

CASE

Mr. Ahmed decided after discussion to start on the non-pharmacological management and the life style modification. You set an appointment after 3 months for re-evaluation and follow up.

3 months later, Mr. Ahmed presented to your clinic, he was doing well with no active complain. He is on diet, lost approximately 4 kg on diet and exercising regularly. You made sure that BP measurement were taken after patient rested, His BP was 148/88. Repeated after 10 minutes was 145/88 other vitals were unremarkable. Patient also recorded average measurement taken with home BP monitoring . Average recording between 140/80 to 150/85.

What is your next step of management ?

03

Browse the book →

- Diabetes mellitus type II
- Kidney disease with a chronic disorder
- Age > 65
- An estimated 10-year risk of atherosclerotic cardiovascular disease of at least 10%.

Choice of initial antihypertensive agents

Much of the research work and guidelines have concluded that the following four classes may be used for treating hypertension:

- Diuretics which are thiazide-like or thiazide-type
- Long-acting calcium channel blockers, mainly dihydropyridine
- Angiotensin-converting enzyme (ACE) inhibitors – inhibit the action of an enzyme that converts angiotensin to its active form
- Angiotensin II receptor blockers (ARBs) – receptor blockers of Angiotensin II

The 2017 ACC/AHA report states that there is no comparable difference between patients dying with heart disease or cardiovascular disorders consuming any of the four drug groups mentioned above.

Additional considerations in the choice of initial therapy

- In the black population or people living in North America and Africa, the first therapy that should be given is drugs with actions much like thiazide or other diuretics. It is also recommended to use calcium channel blockers such as long-acting dihydropyridine.
- In patients with diabetic nephropathy or who are not diabetic but have a severe kidney disorder, especially if proteinuria is present, the first drug of choice is an ACE inhibitor or an ARB.
- Nowadays, beta-blockers are not used as the initial therapy; however, they can be used in case of ischemic heart disease

ACE inhibitors/ARBs

Common Agents: ACEi Ramipril, Lisinopril, Enalapril, **ARB**:losartan,valsartan,perindopril,Irbersartan, Telmisartan

Dose : losartan-50-100mg daily, Enalarpil-10-20mg daily

Monitoring : check electrolytes regularly

Contraindications: angioedema, bilateral renal artery stenosis, allergic or adverse reaction to the drug.

Side Effects: Cough, hyperkalemia Dizziness, Nausea, Hypotension, electrolyte imbalance, urticarial rashes, rarely pancreatitis

Cautions: Hyperkalemia, eGfr< 30mg/dl, symptomatic hypotension

Renal Impairment: Avoid if eGFR is <30.

Pregnancy: Contraindicated

Sick day rule: if risk of dehydration and AKI then stop them and restart once stable.

CASE

You started the patient on Losartan 50mg OD , Patient came after 1 month for follow up. His BP today was 150/85. Repeated in 10 minutes of resting it was 145/85.

You explain to the patient that his BP is still not controlled.

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What Will You Consider Next ?

Calcium channel blockers

Common Agents: Amlodipine, nifedipine, felodipine

Dose : Amlodipine- 5-10mg daily.

Contraindications: Significant Aortic Stenosis. Nifedipine avoid within one month of MI

Caution: Avoid Nifedipine in elderly and longstanding Diabetes(can cause reflex tachycardia)

Side Effects: Headache, peripheral edema, dizziness, flushing, nausea and vomiting and vomiting, tachycardia, rashes, palpitations, rarely gingival hyperplasia

Hepatic Impairment: start at lower dose.

Renal Impairment: can be used.

Pregnancy: Avoid in general , Nifedipine can be used.

Breast Feeding: Avoid. Nifedipine can be used.

Box 5 : common blood pressure medications pharmacological intervention

Thiazide diuretics

Common Agents: Hydrochlorothiazide, bendroflumethiazide, chlorthalidone
Dose : Hydrochlorothiazide- 12.5-25mg daily, indapamide 1.5mg
Monitoring : check electrolytes regularly
Contraindications: Hypercalcemia, Hyponatremia, symptomatic hyperuricemia
Side Effects: Constipation, Diarrhea, Dizziness, Nausea, Postural Hypotension, electrolyte imbalance, urticarial
Cautions: Hypokalemia, Elderly, Hepatic Failure
Hepatic Impairment: Avoid if severe
Renal Impairment: Avoid if eGFR is <30.
Pregnancy: Contraindicated
Sick day rule: stop if vomiting and diarrhea until no risk of dehydration

Centrally acting antihypertensive

Common Agents: clonidine, methyldopa
Dose : Clonidine 50-100 Micrograms 3 times a day , increase every second or third day . Maximum dose 1.2 mg daily. methyldopa 250mg three times a day increase to maximum of 3 g per day every 2 -3 days.
Contraindications : 2nd or 3rd degree heart block , sick sinus syndrome.
Caution: CVA, constipation, heart failure, depression, Raynaud's syndrome, PVD.
Side Effects: clonidine: depression, GI upset, dry mouth , fatigue, headache, sedation, sexual disorders, sleep disorders, postural hypotension. Methyldopa: amenorrhea, angioedema, bone marrow failure, breast enlargement, cognitive impairment, facial paralysis, hepatic disorders, lupus- like syndrome, parkinsonism, psychosis.
Treatment cessation: clonidine must be withdrawn gradually to avoid severe rebound hypertension.
Monitoring: Methyldopa – CBS & LFT before treatment and at intervals during first 6-12 weeks of if unexplained fever occurs.
Renal Impairment: can be used, start with smaller dose.
Pregnancy: use methyldopa

Aldosterone Antagonist

Common Agents: spironolactone
Dose : 25mg-100mg daily
Contraindications : hyperkalemia, renal failure
Side Effects: Diarrhea, stomach cramps, Gynecomastia, headaches, rashes irregular hair growth, impotence, low platelets, liver dysfunction
Hepatic impairment: contraindicated
Renal Impairment: contraindicated
Pregnancy: Contraindicated

Alpha-adrenoceptor blockers

Common Agents: doxazosin , prazosin
Dose : 1 mg once daily for 1 week then increase to 2 mg up to 4 mg once daily.
Contraindications : history of micturition syncope, postural hypotension.
Cautions: postural hypotension with initial dose, cataract surgery (risk of floppy iris syndrome)
Side Effects: arrhythmias, chest pain, cough, cystitis, dizziness, dyspnea, GI discomfort, headache, flu like illness, muscle complaint, palpitations, vertigo
Hepatic impairment: avoid in severe impairment
Renal Impairment: can be used

Beta blockers

Common Agents: Atenolol, bisoprolol, carvedilol.
Dose : Bisoprolol 5-10mg daily, Atenolol 25-100mg daily
Contraindications : Severe Asthma and COPD.
Caution: Peripheral vascular disease
Side Effects: Diarrhea, stomach cramps, blurring of vision, headaches, insomnia, hair loss, dizziness.
Renal Impairment: can be used.
Pregnancy: Contraindicated except labetalol.

CASE

Your patient came 1 month later after starting amlodipine 5 mg OD , he looks well, his vitals were stable. His BP was 128/80. He denies any lower limb edema, headache, nausea or vomiting.

You reassure him, follow up in 6 months .

03

CASE

A 40-year-old female patient with known case of hypertension, compliant on her medication, upon reviewing her medication she is taking, Losartan 50 mg BID, amlodipine 10 MG QHS, and hydrochlorothiazide 12.5 mg OD. She came to your clinic today for follow up. She stated that he has no new complain, no headache, no chest pain or change in vision. You start by taking her vitals:

- Temp: 36.3
- Pulse: 91 beats per min
- O2 sat: 97%
- Blood pressure: 183/121

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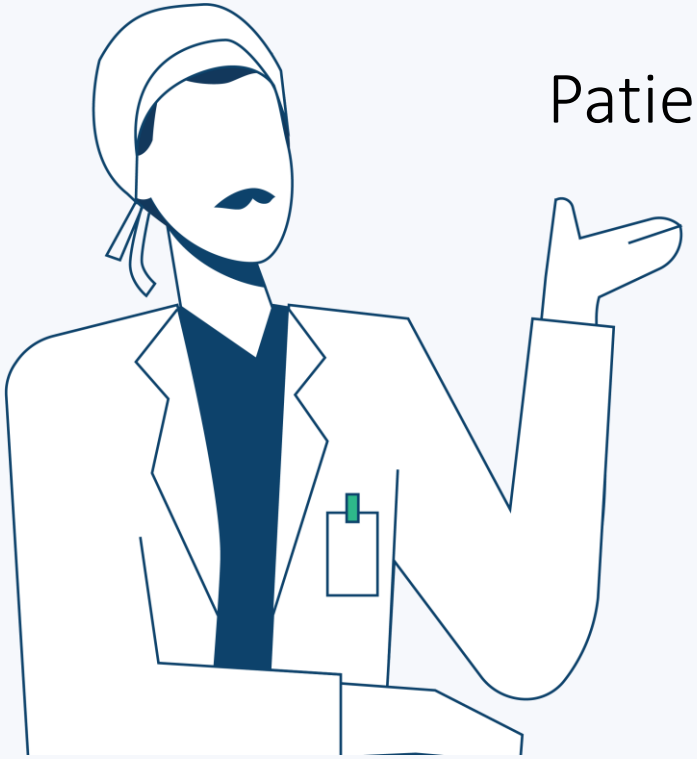
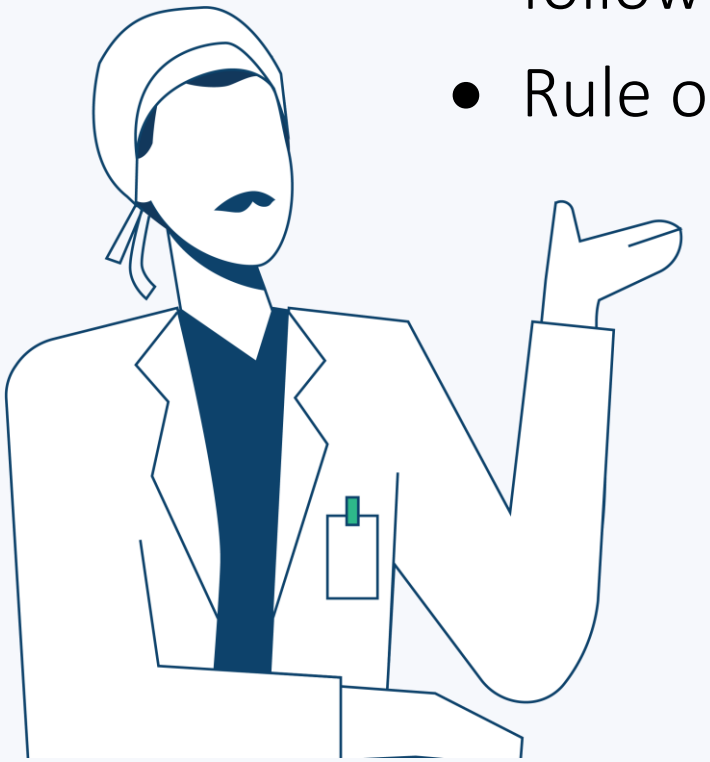
What Is Your Impression Regarding Her BP?

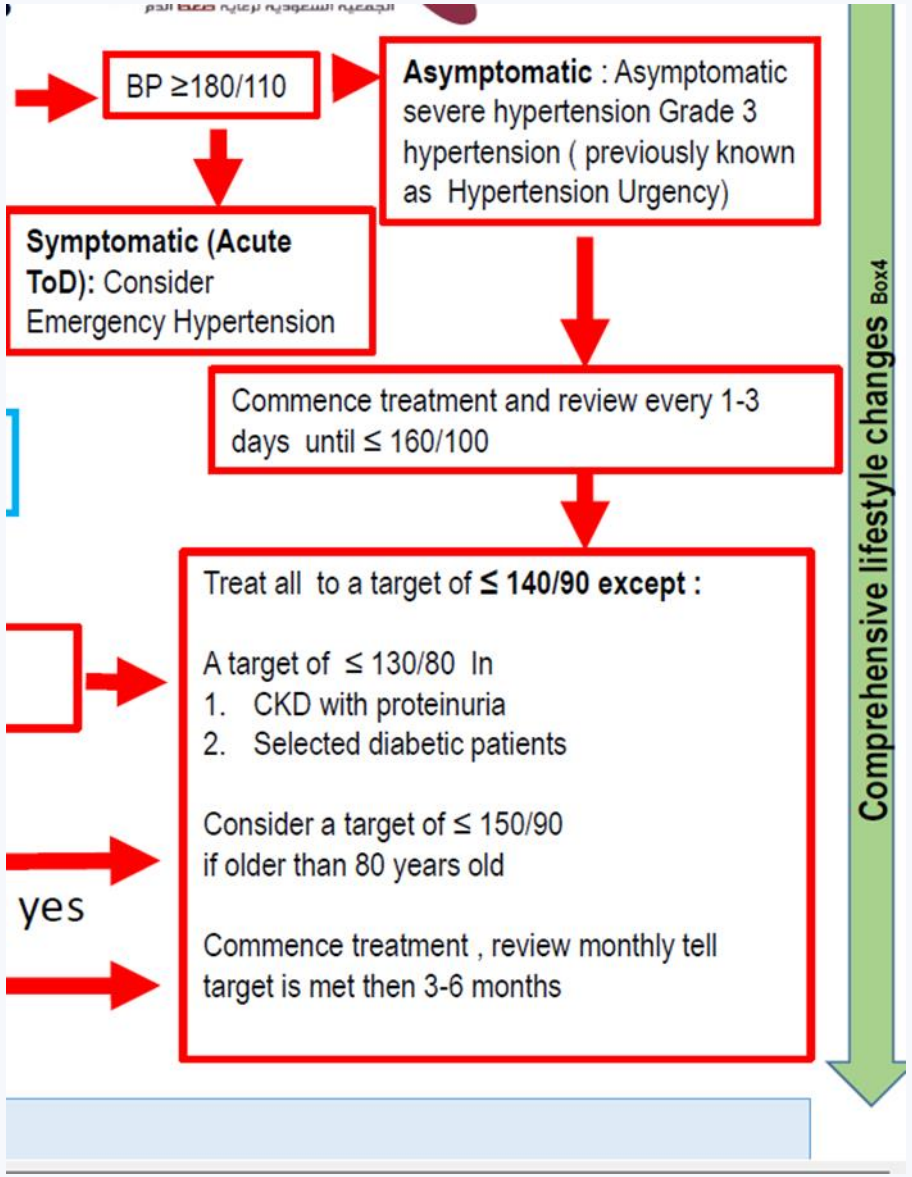


Patient is classified as Asymptomatic Severe Hypertension.

What Is Your Approach In Lowering Her BP?

- Less than 130/80 mmgh lowered over week, follow up ever 1-3 days .
- Rule out any target organ damage.




BP ≥180/110
Asymptomatic : Asymptomatic severe hypertension Grade 3 hypertension (previously known as Hypertension Urgency)
Symptomatic (Acute ToD): Consider Emergency Hypertension
Commence treatment and review every 1-3 days until ≤ 160/100
Treat all to a target of ≤ 140/90 except :
A target of ≤ 130/80 In
1. CKD with proteinuria
2. Selected diabetic patients
Consider a target of ≤ 150/90 if older than 80 years old
Commence treatment , review monthly tell target is met then 3-6 months
yes
Comprehensive lifestyle changes Box4

When Do You Consider Referring The Patient To Secondary Care Facility?

BOX 4

when to refer to secondary care

- Resistant HTN
- Suspicion of secondary HTN
- Sudden onset of HTN
- HTN diagnosed at young age (30 years old)
- Worsening of HTN
- Malignant HTN

THANK YOU.

Dyslipidemia

26/OCT/2022

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Saudi Commission for Health Specialties

Objectives:

- Causes and diagnosis
- Clinical presentation and screening
- Lifestyle management
- Hypertriglyceridemia
- When to refer to secondary care

Case

A 51 years old male, comes for routine health maintenance visit. He has no new complains. He is known case of Hypertension on Hydrochlorothiazide and no other medical history. His last visit to your clinic was one year back. He is a non-smoker and doesn't exercise. His father died of heart attack at the age of 60 years, and his mother died at age of 80 years due to colon cancer. His sisters are all in good health.

On Examination:

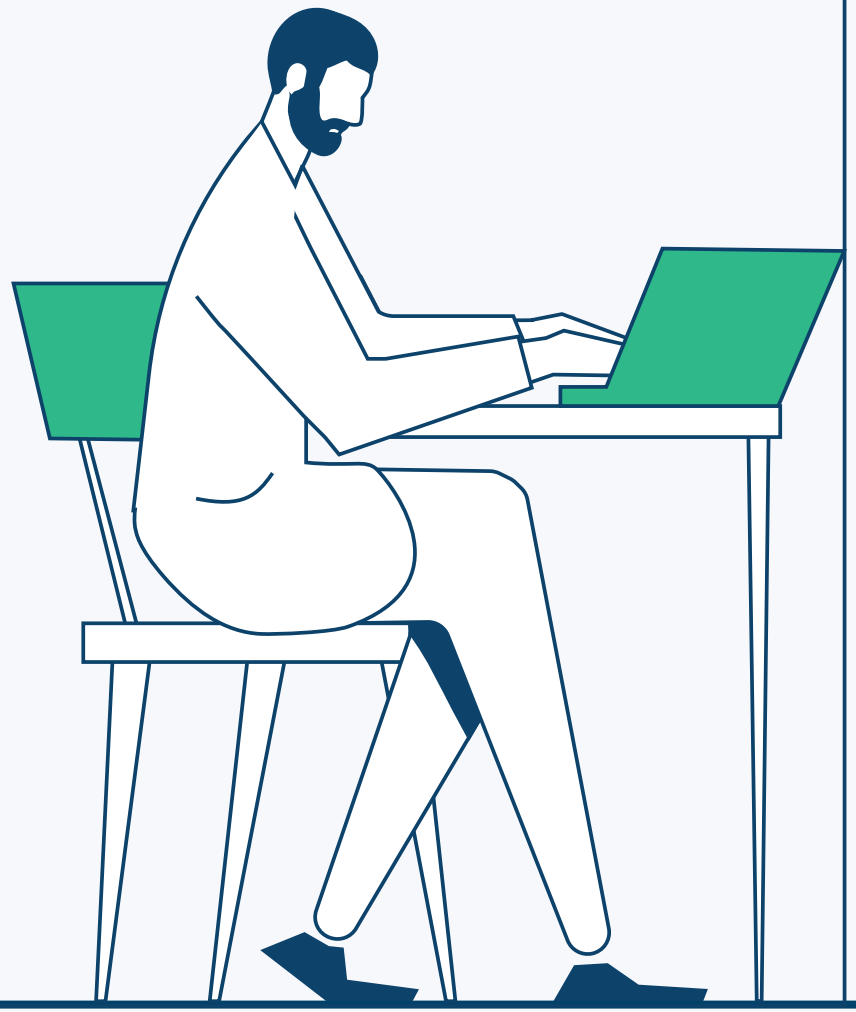
- Blood pressure: 130/80 mmHg
- Pulse 75 beats/ min

01

Case-cont.

You order fasting lipid panel which subsequently returns with the following results:

- Total Cholesterol: 252 mg/dl
- Triglyceride: 201 mg/ dl
- HDL: 37 mg/dl
- LDL: 166 mg/dl.



The Criteria For Diagnosis Of Dyslipidemia

In Nondiabetic :

1. Total Cholesterol ≥ 240 mg/dl
2. Low-density lipoprotein (LDL) cholesterol > 160 mg/dl
3. Triglyceride levels > 200 mg/dl
4. Decreased high-density lipoprotein (HDL)cholesterol
    1. Female <50 mg/dl
    2. Male<40 mg/dl

Important consideration regarding measuring the lipid profiles

- Fasting or non-fasting plasma lipid levels is effective in estimating ASCVD risk
- If initial non-fasting lipid profile reveals a triglyceride ≥ 400 mg/dl a repeat fasting lipid profile should be obtained

Dyslipidemia etiology

- **Primary causes**
  1) Familial hypercholesterolemia
  2) Familial hypertriglyceridemia
  3) Familial combined hyperlipidaemia
- **Secondary causes**

Increased LDL level	Increased triglyceride level	Decreased HDL level
– Diabetes mellitus	– Diabetes mellitus	– Diabetes mellitus
– Hypothyroidism	– Hypothyroidism	– Cigarette smoking
– Nephrotic syndrome	– Abdominal obesity	– Abdominal obesity
– Obstructive liver disease	– Alcoholism	– Hypertriglyceridemia
– Anabolic steroids	– Renal insufficiency	– Uremia
– Progestins	– Beta-adrenergic blockers	– Menopause
– Beta-adrenergic blockers	– Bile acid binding resins	– Puberty (in males)
– Thiazides	– Estrogen	– Anabolic steroids
		– Beta-adrenergic blockers
		– Progestins

Table 2 – Secondary causes of dyslipidemia

https://saudifamilymedicine.com/index.php/documentation/section-1-fm/chapter-2-dyslipidemia/etiology-of-dyslipidemia/

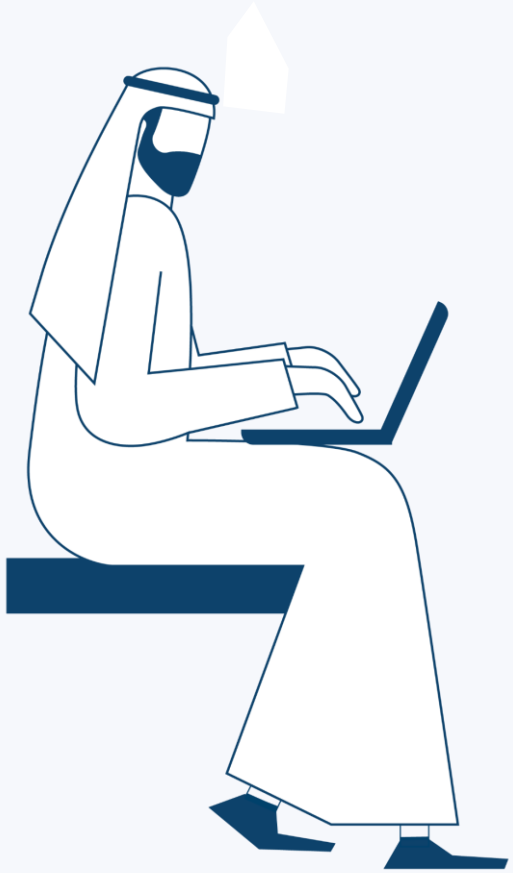
Lab investigation for secondary causes of dyslipidemia:

- Fasting glucose
- LFT
- RFT
- TSH
- ACR

Statin therapy

Before Starting Statin,

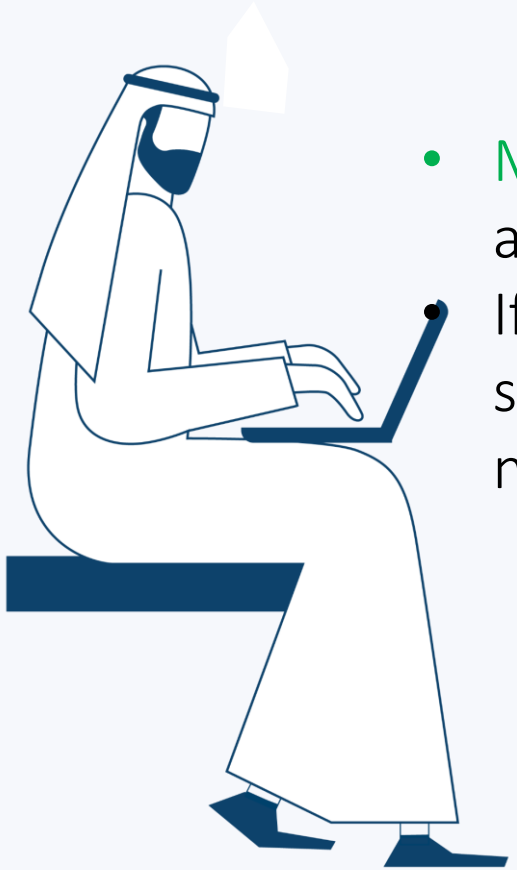
What are important precautions you should keep in mind?



- History of liver disease
- Risk of muscle toxicity (muscle disease , high alcohol intake)
- Untreated hypothyroidism
- Older female
- Low BMI

Statin therapy contraindications?

1) Reproductive-age female (**teratogenicity**)
   - ❖Before conception: discontinue 3 months before attempting to conceive
   - ❖Pregnancy
   - ❖Breast feeding
2) CKD : eGFR <30
3) Myopathy : CK > 10x UNL
4) Transaminase : 5x vs. 3x UNL
   1) 3x UNL : in not c/I for initiation .



- Muscle effect: The risk of myositis, myopathy and rhabdomyolysis is rare although myalgia is common among statin users.
- If statin is suspected to cause myopathy and Creatine kinase >10 X UNL. stop statins and monitor symptoms, once CK concentration return to normal re-introduce statin at lower dose and monitor patient.

Statin therapy in renal failure ?

Renal impairment: eGFR <30

1) Avoid Rosuvastatin
2) **Simvastatin** reduce to 10 mg
3) **Atorvastatin** reduce to 20 mg

10-year risk of atherosclerotic CVD : after the age of 40

AMERICAN COLLEGE of CARDIOLOGY

ASCVD Risk Estimator Plus

Estimate Risk | Therapy Impac

Current Age *
Age must be between 20-79

Sex *
Male | Female

Race *
White | African American | Other

Systolic Blood Pressure (mm Hg) *
Value must be between 90-200

Diastolic Blood Pressure (mm Hg) *
Value must be between 60-130

Total Cholesterol (mg/dL) *
Value must be between 130 - 320

HDL Cholesterol (mg/dL) *
Value must be between 20 - 100

LDL Cholesterol (mg/dL)
Value must be between 30-300

History of Diabetes? *
Yes | No

Smoker? *
Current | Former | Never

On Hypertension Treatment? *
Yes | No

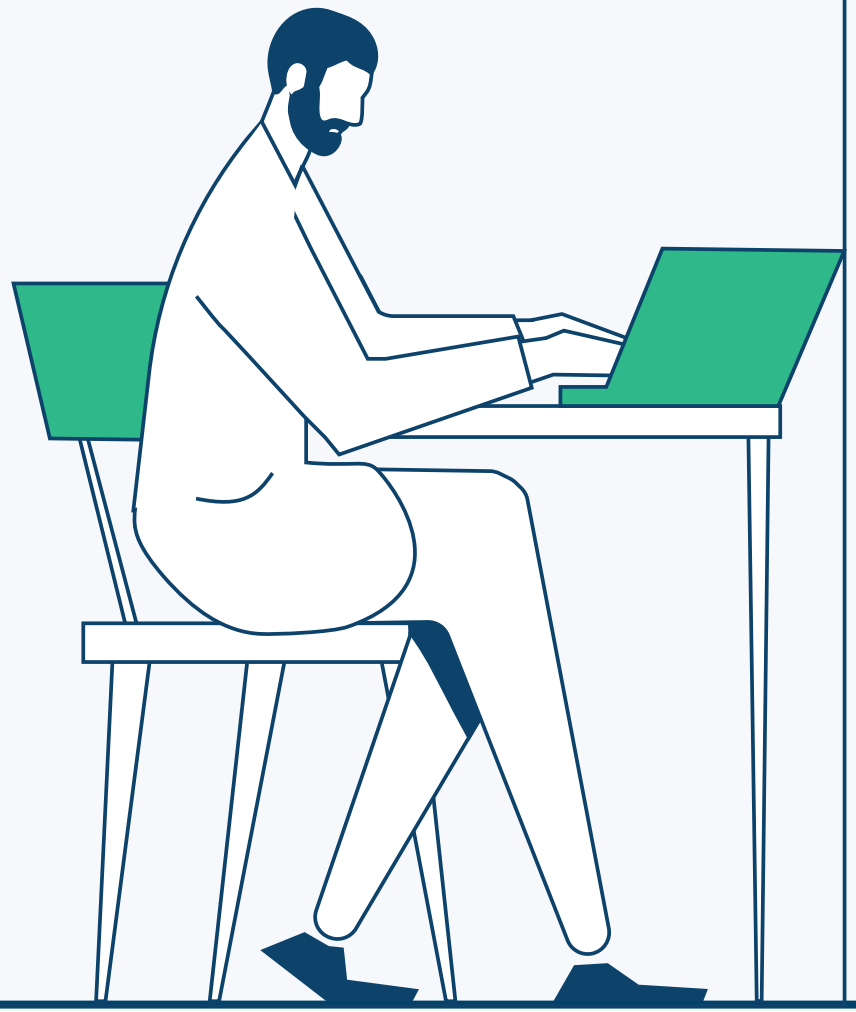
On a Statin?
Yes | No

On Aspirin Therapy?
Yes | No

Do you want to refine current risk estimation using data from a previous visit?
Yes | No

10-Year Risk Of Atherosclerotic CVD : interpretation

Low (less than 5%): LSM
Borderline (5% to 7.4%): risk enhancers?
Intermediate (7.5% to 19.9%): moderate intensity statin
High (20% or greater) risk: high intensity statin



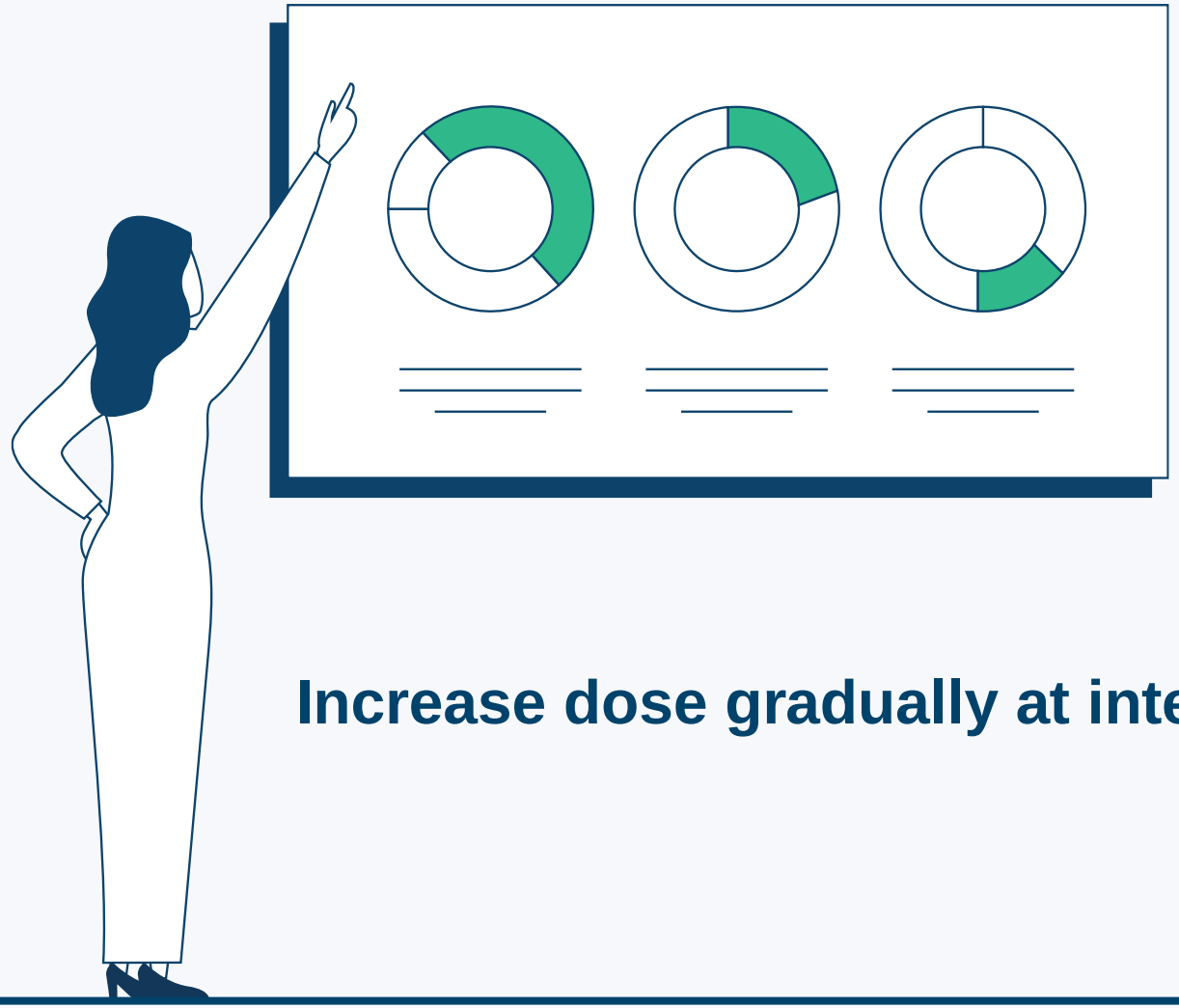
High intensity statin indications

1. LDL > 190 mg/dl
2. 10-year risk assessments >20%
3. DM + >40years old + 10-year risk assessments >20%
4. Hx of **ASCVD** : as 2ndry prevention

Examples for statin therapy

	High intensity	Moderate intensity	Low intensity
LDL-C lowering	more than or equal to 50%	30% to 49%	less than 30%
Statins	Atorvastatin 40-80 mg Rosuvastatin 20-40 mg	Atorvastatin 10-20 mg Rosuvastatin 5-10 mg Simvastatin 20-40 mg	Simvastatin 10 mg
		Pravastatin 40-80 mg Lovastatin 40-80mg Fluvastatin XL 80 mg Fluvastatin 40 mg BID Pitavastatin 1-4 mg	Pravastatin 10-20 mg Lovastatin 20 mg Fluvastatin 20-40 mg

Table 2.3 – Statin intensity



Increase dose gradually at intervals of at least 4 - 6 weeks.

Side effects of statin therapy

- Common: myalgia ,lack of energy, constipation, diarrhea, nausea, dizziness, headache, thrombocytopenia and sleep disorders.
- Uncommon: alopecia, memory loss, pancreatitis, paresthesia, sexual dysfunction and hepatic disorder.
- Rarely: myopathy, peripheral neuropathy and tendinopathy.
- Frequency unknown: depression, diabetes mellitus and nterstitial lung disease

PCKPS (injectable monoclonal antibody)

When to monitor lipid profiles?

- After starting or changing statin therapy : 4 - 12 weeks
  - Fasting lipid measurement should be repeated
  - to assess:
    - adherence, response to medications and lifestyle changes
- Afterwards: every 3 - 12 months as needed

Case

A 43 years old female, obese women, known case of Diabetes Type 2 on metformin 2g daily came to your clinic one month after starting 40 mg of Atorvastatin. She stated that she has been compliant to her medications. But recently she has been experiencing arm and leg pain. She tried taking over the counter pain medication with minimal effect. She is concerned as she is having difficulty in her work. She is a smoker, smokes half a pack daily. She has no family history of heart disease.

02

Case-cont.

On Examination:

1. Blood pressure: 135/80 mm Hg
2. Pulse 80 beats/ min

On investigations:

last Fasting lipid profile:

1. Cholesterol: 280 mg/dl
2. Triglyceride: 150 mg/ dl
3. HDL : 40 mg/dl
4. LDL: 174 mg/dl

What is the appropriate management ?

- Muscle symptoms due to statins can occur without enzyme elevation. They occur in 10% of patients taking statins and may be dose dependent.

- Adverse effects are more common among older patients, patients with several disorders, and patients with polypharmacy.

- Ways reduce side effects?
  - Changing from one statin to another
  - Lowering the dose
  - **Statin holiday.**

What is the appropriate monitoring techniques in this patient?

- Checking liver function: before , 3m , 12 m after starting.
  If LFTs are elevated but less than three times the upper normal limit they should not be stopped routinely.

Case

A 31-year-old male comes to your clinic for routine health maintenance visit. His last visit with you was two months back and you noted that his last lab results were normal except Triglycerides level of 450 mg/dl. He has no complains and is feeling well. He is athletic recently joined the Saudi Football Team and is maintaining a healthy diet. He is a nonsmoker, has no medical illness and does not drink alcohol. His father is a 63-year-old mechanical engineer fit and healthy for his age but is on statin medication since he was young. His mother is a 57-year-old housewife known case of diabetes mellitus Type 1 on regular insulin. You Examine the patient

On examination:

- BMI: 21 kg/m^2, Blood Pressure: 120/80 mm Hg, Pulse: 83 beats/min., Temp 36

03

Case-cont.

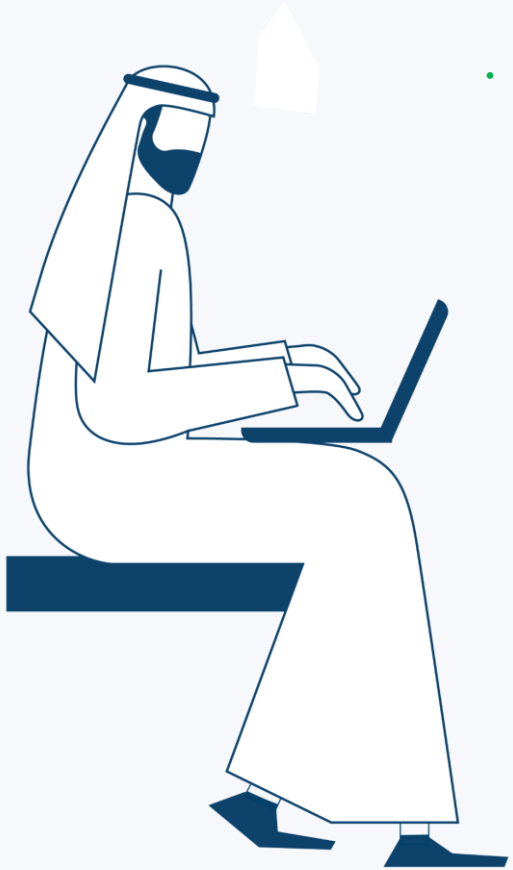
On general inspection you notice a raised waxy appearing, yellowish skin lesion on the extensor of both arms

You order lipid panel and comes back with the following results:

1. Total Cholesterol: 170 mg/ dl
2. HDL: 55 mg/dl
3. LDL: 100 mg/dl
4. Triglyceride: 350 mg/ dl

Eruptive xanthomas.

What is the diagnosis ?



- Isolated hypertriglyceridemia: TG > 150 mg/dl.
- hypertriglyceridemia calssifications:
  - Normal: <150 mg/dL (<1.7 mmol/L)
  - Moderate hypertriglyceridemia: 150 to 499 mg/dL (1.7 to 5.6 mmol/L)
  - Moderate to severe hypertriglyceridemia: 500 to 999 mg/dL (5.65 to 11.3 mmol/L)
  - Severe hypertriglyceridemia: >1000 mg/dL (>11.3 mmol/L)

Hypertriglyceridemia

Physicians should rule out secondary causes: alcohol use, hypothyroidism, obesity, diabetes, and drug induced. The aim of treatment is to prevent pancreatitis and lower the cardiovascular risk. They are associated with multiple metabolic abnormalities that contribute to coronary artery disease (e.g., diabetes, metabolic syndrome). Consensus is emerging that lowering elevated triglycerides is beneficia. Refer if triglycerides higher than > 885 mg/dl

In Isolated hypertriglyceridemia treat with omega-3 fatty acids or fibrates to a target less than 500 mg/dl. If the patient is already on a statin and triglycerides are persistently above 500 mg/dl then add omega-3 fatty acids or refer to secondary ca
If the patient has an indication to start a statin and triglycerides are above 500 mg/dl then they should be started on a stati
first line.

When to refer to secondary care?

- Suspected Familial Hypercholesterolemia
- Family history of Premature Heart Disease
  - Sudden premature cardiac death
  - Premature coronary artery disease <50 years
- Cholesterol > 290 mg/dl in the absence of Family history
- Triglycerides level > 885
- Intolerance to Statins

ANY QUESTIONS?

THANK YOU.