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326

MODEL ANSWERS

12

EXAM SESSIONS

Jun 2020 – Dec 2025

FOR THE DNB FAMILY MEDICINE EXIT EXAMINATION

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REVIEWED BY — DNB FAMILY MEDICINE

Dr. Vijay Shekhar • Dr. Sushmita Bansal • Dr. Kashish Khanna
Dr. Kajal Shukla • Dr. Amit Kumar

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ABOUT THIS SAMPLE

Inside the Set

All four volumes · Papers I–IV · 480 questions · 326 model answers

What this book is

This free sample brings together pages from all four volumes of the Clinica Publication DNB Family Medicine Solved Papers set: the opening of each volume's index and its first model answers, printed exactly as they appear in the book, with the book's own page numbers. The complete set answers all 480 theory questions set across 12 sessions of the exit examination, from June 2020 to December 2025, in 326 model answers.

How the answers are written

Answers are written from the pages of thirteen standard textbooks (Murtagh's General Practice at the core, with one lead book for each subject) and from current Government of India programme documents, treatment guidelines and Acts, with international guidance where it differs. The SOURCE line under the questions names the book chapters and pages and the guideline documents used; every web-sourced fact is listed in the register at the end of the volume.

Reading an answer

ASKED 3* · how often the question has been set

SOURCE book chapters, pages & guidelines used

MANAGEMENT BASIS

Amber strip — names the Government of India document first, then the international one.

SAFE DIAGNOSTIC STRATEGY

Slate box — Murtagh's safe diagnostic strategy with the Indian layer.

REFER WHEN

Teal box — when to refer.

PEARLS

Green box — exam pearls.

The complete set

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Jun 2020 – Dec 2025

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Solved Previous-Year Questions

Volume I • Paper I

90 model answers • 121 questions

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HOW TO USE

Each answer groups every year and paper in which the question was asked ("Asked in") and answers the union of the parts asked. The badge shows how often it was asked. The SOURCE line under the questions names the book chapters and pages and the guideline documents used. Amber MANAGEMENT BASIS strips name the Government of India document first, then the international one. Slate boxes give Murtagh's safe diagnostic strategy with the Indian layer; teal boxes say when to refer; green boxes are exam pearls. A lists the parts, B this volume question by question, C the high-yield list (asked 3× or more).

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PART I

General Medicine – Cardiology

1. Brief episodes of loss of consciousness in a 60-year-old – DDx, history & examination, investigations

ASKED 2* · 10-mark answer

Asked in: Jun 2020 · Paper I · Q4 (10 marks) · Dec 2020 · Paper I · Q8 (10 marks)

Q (Jun 2020 · Paper I · Q4): A 60-year-old man is brought to you with history of brief episodes of loss of consciousness over the past week. a) List the differential diagnosis for this presentation [4] b) What history and physical examination would you elicit? [3] c) How will you investigate this patient? [3]

Q (Dec 2020 · Paper I · Q8): A 60-year-old man is brought to you with history of brief episodes of loss of consciousness over the past week. a) List the differential diagnosis for this presentation. [4] b) What history and physical examination would you elicit? [3] c) How will you investigate this patient? [3]

SOURCE MUR — Presenting symptoms (ch. 43, 45) and The unconscious patient (ch. 63) — pp. 540, 560, 771–778 · HAR — ch. 23 Syncope; ch. 436 Seizures and Epilepsy — pp. 161, 3418

Differential diagnosis

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: **reflex (vasovagal) syncope** and **orthostatic hypotension** are the commonest causes of unconsciousness in general practice. Reflex syncope is the main cause of repeated fainting. At 60 years, think of autonomic failure (age-related, or secondary to diabetes or amyloid). Also consider drug-induced hypotension, since most such drugs are not named in the pages I was given.
- Serious disorders not to be missed: **cardiac arrhythmia** (complete heart block, sick sinus syndrome, ventricular tachycardia) causing Stokes–Adams attacks, especially in the elderly. Also **aortic stenosis** and HOCM (effort syncope), **silent myocardial infarction** and **hypoglycaemia**, **epilepsy**, and **TIA/vertebrobasilar insufficiency**. Also **subarachnoid haemorrhage** and **subdural haematoma** after seemingly trivial injury in the elderly.
- Pitfalls: confusing dizziness, weakness or drop attacks with true blackout. Missing hypoglycaemia in someone on sulfonylureas or insulin. Missing prolonged QT.
- Masquerades: cataplexy, falls from vestibular, cerebellar or extrapyramidal disease, and hypoglycaemia. Seizure is also a common mimic.
- Is the patient trying to tell me something?: frequent faints without prodrome, rarely causing injury, and with no haemodynamic change suggest psychiatric causes (anxiety, panic, depression, somatisation). Psychogenic blackouts can coexist with epilepsy.
- Indian layer: the pack has no ICMR/MoHFW workflow for syncope, so the ESC 2018 syncope guideline is the reference. Cardiac syncope (bradyarrhythmia, tachyarrhythmia, structural heart disease) is a common cause. Anaemia or GI bleeding can cause hypovolaemic syncope.

Table 1: Differential diagnosis of brief loss of consciousness at 60 years

Group	Causes	Pointer
Reflex syncope	Vasovagal, micturition, cough, carotid sinus	Trigger, prodrome, pallor and sweating, rapid recovery
Orthostatic / autonomic	Postural hypotension, drugs, diabetes, amyloid, meals or alcohol	Occurs on standing, recovery is rapid
Cardiac	Heart block, sick sinus, VT, long QT, aortic stenosis, HOCM, MI	Sudden fall without warning, exertional, palpitations
Neurological	Epilepsy, TIA/VBI, SAH, subdural haematoma, drop attack	Aura, automatism, confusion, focal signs
Metabolic	Hypoglycaemia, hypoxia	Hunger, sweating, tremor
Psychogenic	Anxiety, panic, hyperventilation, functional	Labile affect, no injury

History and physical examination

History

- Ask about the **circumstances**: posture, exertion, straining, micturition, cough, heat, prolonged standing, a tight collar or neck turning.
- Ask about the **prodrome**: faintness, nausea, sweating, fading hearing or vision, with pallor and a slow slide to the ground suggesting reflex syncope.
- Palpitations, or a sudden fall without warning and without convulsions, suggest an arrhythmia.
- High-risk features:
 - new chest discomfort, abdominal pain, dyspnoea or headache
 - syncope during exertion or while supine
 - sudden palpitations followed by syncope
 - severe coronary or structural heart disease
- Ask about **seizure features**: aura, tongue biting, twitching, incontinence, postictal confusion and slow recovery. Motor activity lasting >15 s favours seizure.
- Ask about **hypoglycaemia**: diabetes treatment, reduced intake, and hunger or sweating beforehand.
- Neurological symptoms: dysphasia, dysarthria, vertigo or hemisensory loss (VBI); thunderclap occipital headache with neck stiffness (SAH); recent head injury.
- Drug and family history: centrally acting drugs, sulfonylureas, beta blockers, alcohol, hypertension, and family history of sudden cardiac death.
- Get an **eyewitness account**, and a phone video if available.

Examination

- **Orthostatic BP and heart rate**: supine, then after 3 min standing.
- Pulse rate and rhythm, with bradycardia <40/min and systolic BP <90 mmHg as high-risk signs.
- Cardiovascular: an undiagnosed systolic murmur (aortic stenosis, HOCM).
- Look for GI haemorrhage (pallor, PR examination).
- Full neurological examination for focal signs, papilloedema and neck stiffness/Kernig sign.
- Examine for tongue bite and signs of injury.
- Carotid sinus massage, only if indicated, with ECG and BP monitoring, and avoided if carotid bruits or plaques are present.

Investigations

MANAGEMENT BASIS

India: no ICMR/MoHFW workflow for syncope in the pack · International: ESC — Guidelines for diagnosis and management of syncope — 2018; HAR 22e, ch. 23

Table 2: Stepwise investigation of syncope at 60 years

Level	Test	Purpose
Bedside, all	Lying and standing BP, and heart rate	Orthostatic hypotension
Bedside, all	Capillary blood glucose	Excludes hypoglycaemia
First line	ECG	Brady- or tachyarrhythmia, AV block, ischaemia, old MI, long QT, bundle branch block. This initial assessment identifies the cause in ~50%
Selective bloods	Troponin, Hb, electrolytes, and other tests when a specific cause is suspected	Baseline tests rarely help unless a disorder is suspected
Cardiac	Echocardiography	If cardiac disease history, abnormal examination or ECG: aortic stenosis, HCM, tamponade
Rhythm monitoring	In-hospital ECG monitoring when a life-threatening arrhythmia is likely; Holter if daily episodes; loop recorder for infrequent episodes (implantable, if low risk of sudden cardiac death)	Documents the arrhythmia
Exertional	Treadmill ECG	Exercise-related syncope
Autonomic	Tilt-table test (specialised centres)	Reflex vs orthostatic mechanism
Carotid sinus massage	Patients >40 y with recurrent syncope of unknown cause, compatible with a reflex mechanism	Carotid sinus syndrome
Neurological	CT/MRI brain, EEG	Only if history suggests seizure, stroke, SAH or haematoma
Invasive	Electrophysiology study	Structural heart disease with a non-diagnostic work-up

- Psychiatric screening is for recurrent unexplained episodes.
- Echocardiography also gives LV ejection fraction for risk stratification.

PEARLS

- Syncope is transient loss of consciousness with a prodrome and rapid recovery, usually within seconds to 3 min.
- The cardiac cause not to be missed is an arrhythmia (Stokes–Adams), which causes a sudden fall without warning.
- The first-line investigation is an ECG, plus lying and standing BP and blood glucose.
- Exertional syncope should prompt a search for aortic stenosis or HOCM.
- Trap: always check glucose in an unconscious or blacking-out patient, including patients on sulfonylureas.

Web sources: [W1] ESC — 2018 ESC Guidelines for the diagnosis and management of syncope — 2018 — <https://academic.oup.com/eurheartj/article/39/21/1883/4939241>

2. Approach to palpitations; common arrhythmias; treatment of PSVT

ASKED 1* · 10-mark answer

Asked in: Dec 2025 · Paper I · Q6 (10 marks)

Q (Dec 2025 · Paper I · Q6): A 45-year-old gentleman complains of unpleasant awareness of his own heartbeat. a) What is your diagnostic approach to a person coming with palpitations? [5] b) What are the common arrhythmias seen in practice? [2] c) How will you treat PSVT? [3]

SOURCE MUR — Ch. 58 Palpitations — pp. 717–718, 722–723, 730 · HAR — Ch. 253 Approach to Supraventricular Arrhythmias; Ch. 256 Paroxysmal Supraventricular Tachycardias — pp. 1933, 1938–1942

Diagnostic approach to palpitations [5 marks]

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: if not anxiety or fever, then sinus tachycardia and atrial or ventricular ectopics; PSVT and AF are also common.
- Serious disorders not to be missed: myocardial infarction/angina (about 25% of infarcts are silent or unrecognised), AF/flutter, VT, torsade de pointes, sick sinus syndrome, complete heart block, long QT, WPW, and low K^+ , Mg^{2+} or glucose.
- Pitfalls: PSVT misdiagnosed as anxiety; fever/infection, pregnancy, menopause, caffeine or cocaine, mitral valve disease, aortic incompetence, hypoxia.
- Masquerades: depression, diabetes (silent MI or hypoglycaemia), drugs, anaemia, hyperthyroidism, spinal dysfunction (T1–5), UTI.
- Is the patient trying to tell me something?: quite likely, so consider cardiac neurosis and anxiety.
- Indian layer: rheumatic mitral stenosis and aortic incompetence are recognised causes of palpitations. Search for thyrotoxicosis even if the signs are subtle.
- Indian layer: in AF, use CHA_2DS_2 -VASc and HAS-BLED, and refer if the rate is uncontrolled or there is CHF or angina.

History and examination

- Ask the patient to **tap out the rate and rhythm** of the abnormal beat.
- Onset: sinus tachycardia starts and stops gradually, at 100–150/min. PSVT is abrupt, at 160–220/min.
- Palpitations unrelated to emotion, fever or exercise suggest an arrhythmia.
- Ask about drugs (including alcohol, caffeine, cigarettes), triggers, and symptoms of dizziness or syncope.
- Ask about a family history of sudden death.
- Examine pulse, BP and heart rate, valves, and thyroid signs. For a middle-aged woman with unusual chest pain, auscultate standing to bring out the click of mitral valve prolapse.

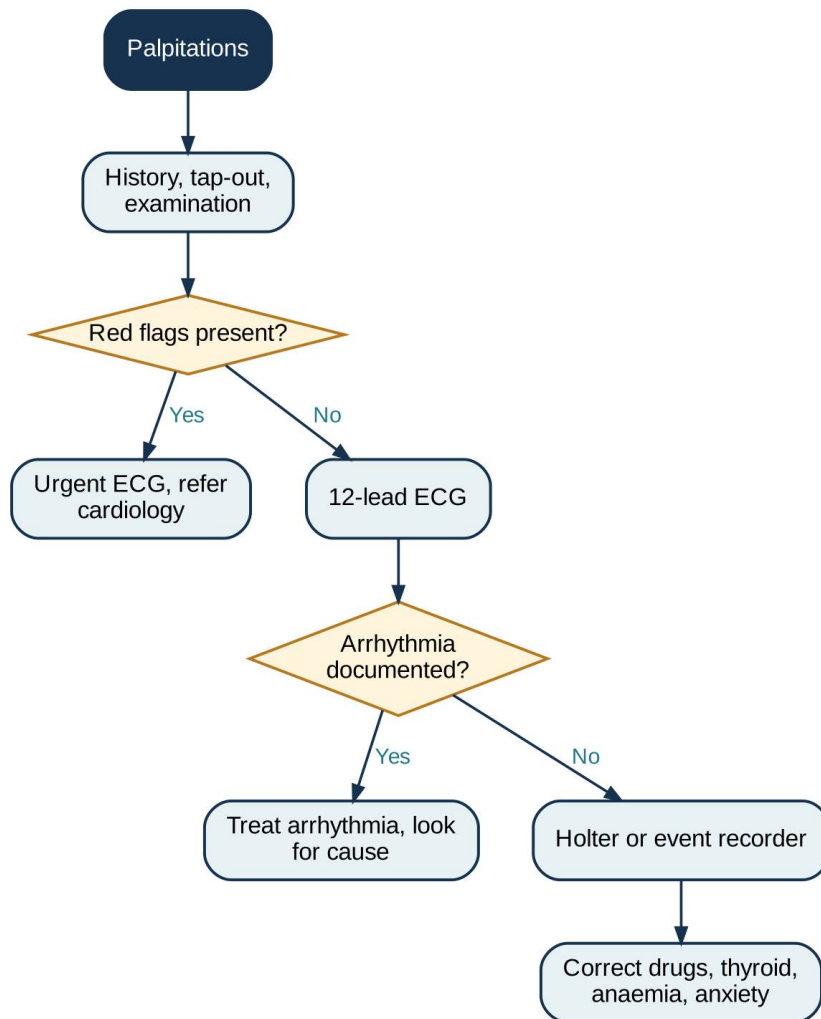
Red flags

- Lightheadedness, chest pain, new irregular rhythm.
- Rest heart rate >120 or <45 /min.
- Significant heart disease or a family history of sudden death.

Investigations

- A **12-lead ECG is mandatory**. If the cause is not documented, use an ambulatory monitor (Holter).
- A normal ECG in sinus rhythm does not exclude an accessory pathway.
- The ECG at the time of symptoms is needed to diagnose SVT. Exercise testing may reproduce exercise-related symptoms.
- Targeted tests: TSH, Hb, glucose, K^+ and Mg^{2+} .

Flowchart 1: Approach to palpitations in general practice

**REFER WHEN**

- A sustained SVT is suspected.
- The ECG shows sustained delta waves of WPW, even if the patient is asymptomatic.
- Syncope or dizziness suggests a cardiovascular cause.
- A paroxysmal arrhythmia may explain unexplained symptoms.
- The need for anticoagulation, rate control or rhythm control is uncertain.

Common arrhythmias seen in practice [2 marks]



FIGURE 58.4 Tracings of important arrhythmias.

FIGURE 58.4 — reproduced from Murtagh's General Practice 9e, p. 723.

Table 1: Common arrhythmias

Arrhythmia	Key point
Premature ectopics (atrial/ventricular)	Commonest symptomatic arrhythmia; occasional ectopics occur in 40% of older people and rarely need treatment
Atrial fibrillation	Commonest sustained arrhythmia (1–2% of population); 5–10% over 65 years
PSVT	6 per 1000; commonest mechanism is re-entry; AVNRT is its commonest form
Sinus tachycardia / bradycardia	Usually physiological; treat only if symptomatic
Atrial flutter, VT, complete heart block	Serious; refer

- AF: start an oral anticoagulant and control the rate with one drug or a beta-blocker plus calcium-channel blocker.

Treatment of PSVT [3 marks]

MANAGEMENT BASIS

India: no ICMR/MoHFW PSVT workflow in the pack · International: ESC — 2019 SVT Guidelines (as adapted in HAR 22e, ch.256), HAR 22e ch.256

- Monitor the ECG continuously and obtain a 12-lead ECG.
- **Unstable** (hypotension with unconsciousness, or respiratory distress): QRS-synchronous DC cardioversion.
- **Stable:**
 - Step 1: Valsalva manoeuvre in a cooperative patient; teach the patient to repeat it.
 - Step 2: carotid sinus massage only if there is no carotid bruit and no prior stroke.
 - Step 3: IV **adenosine 6 mg, then 12 mg** to cause transient AV block.
- If vagal manoeuvres and adenosine fail, the next step is in the part of HAR pr.1942 that was cut off, so it is not stated here.
- Child or infant: ice pack to the upper face first, then IV adenosine.
- **Preexcited AF** (wide, irregular): AV nodal blockers (verapamil, diltiazem, beta blockers, adenosine, amiodarone) are contraindicated. Use cardioversion or IV procainamide/ibutilide.

- Avoid digoxin in WPW.

Prevention

- Reassurance and Valsalva teaching. A beta blocker, verapamil or diltiazem taken at onset can help.
- Chronic beta blocker, verapamil, diltiazem or flecainide if prophylaxis is needed.
- Avoid triggers: smoking, anxiety, caffeine.
- Catheter ablation of the slow pathway is curative in >95%, with AV block needing a pacemaker in <1%. It is for recurrent or severe episodes, or when drugs fail or are not tolerated.

PEARLS

- Palpitations are an awareness of the heartbeat. A 12-lead ECG is mandatory.
- Abrupt onset at 160–220/min suggests PSVT. Gradual onset at 100–150/min suggests sinus tachycardia.
- Do not label PSVT as anxiety.
- Adenosine 6 mg then 12 mg is the first drug. Use synchronised DC shock if unstable.
- Preexcited AF: no AV nodal blockers.
- Always check for thyrotoxicosis, anaemia and drugs.

Web sources: [W1] ICMR — Standard Treatment Workflows: Cardiology (atrial fibrillation workflow) — https://www.icmr.gov.in/icmrobject/uploads/STWs/1771492083_cardiology_all.pdf

3. Atrial fibrillation – work-up, rate vs rhythm control, anticoagulation, stroke-risk

ASKED 2* · 10-mark answer

Asked in: Dec 2022 · Paper I · Q4 (10 marks) · Oct 2023 · Paper I · Q7 (10 marks)

Q (Dec 2022 · Paper I · Q4): A 67-year-old lady was brought to the emergency room with h/o dizziness but no loss of consciousness. She is a known diabetic and hypertensive, occasionally noncompliant with her medications. Her BP is 130/86mmHg, PR- 86/min - irregularly irregular, GRBS- 186mg%. a) What immediate office investigation would you do? [1] b) What may be the most probable diagnosis? [1] c) What other investigations you would want to do? [2] d) What are the complications of this condition? [2] e) How will you assess this patient for stroke risk? [2] f) How will you manage this patient? [2]

Q (Oct 2023 · Paper I · Q7): A 74-year-old woman presents for her annual physical examination and notes increasing fatigue over the past 3 months. Her history is notable for longstanding systolic hypertension. A physical examination now demonstrates a blood pressure of 120/70 mmHg and an irregular pulse of approximately 120 bpm at rest. The patient's body mass index is 22. An electrocardiogram confirms atrial fibrillation with a ventricular response of 120 bpm and ECG suggestive of left ventricular hypertrophy. An echocardiogram done a year earlier to evaluate left ventricular hypertrophy was notable only for mild, global left ventricular dysfunction with a left ventricular ejection fraction of 40% and mild mitral regurgitation. The patient's chronic medical regimen includes lisinopril 20 mg, metoprolol XL 25 mg and 75 mg aspirin daily. A repeat echocardiogram performed in the office demonstrates an ejection fraction of 20% with global hypokinesis. a) What medications should be chosen to control the rate acutely? [2] b) What further work up is required for new onset AF? [2] c) Should one restore sinus rhythm or choose a strategy of rate control? [2] d) What are the anticoagulation requirements for this patient? [2] e) If the decision is made to maintain sinus rhythm after the cardioversion, what are the best medical or procedural options? [2]

SOURCE HAR — Ch. 258 Atrial Fibrillation — pp. 1949–1952

1. Immediate office investigation

- **12-lead ECG.** It confirms AF and shows the rate and any ischaemia or LVH.
- Check the pulse deficit and do a bedside glucose (GRBS is already 186 mg%).

2. Most probable diagnosis

- **Atrial fibrillation**, because the pulse is irregularly irregular.
- Dizziness fits AF. Loss of atrial systole and variable stroke volume cause presyncope and fatigue.
- Hypertension and diabetes are the likely substrate.

3. Other investigations

- **Echocardiography** for LV function, LA size and valve disease. AF is particularly poorly tolerated in HF, valvular disease and hypertrophic cardiomyopathy.
- **TEE or delayed-acquisition cardiac CT** to exclude left atrial appendage thrombus if cardioversion is planned and AF duration is >48 h or unknown.
- Diabetes and renal work-up (creatinine for DOAC dosing).
- Look for aggravating factors, since these are addressed in every AF strategy.
- Ambulatory ECG if paroxysmal AF is suspected. Subclinical AF can be found only by long-term monitoring.

4. Complications of AF

- **Haemodynamic:** loss of atrial contribution to cardiac output, giving exercise intolerance, fatigue, presyncope and dyspnoea. It worsens heart failure in diseased hearts.
- **Syncope or presyncope:** slow AF with AV nodal disease, or pauses on conversion to sinus rhythm.
- **Thromboembolism:** thrombus forms mainly in the left atrial appendage and causes **ischaemic stroke**.
- **Cognitive impairment and dementia**, from recurrent silent emboli.
- **Tachycardia-induced cardiomyopathy**, usually reversible once the rate is controlled.
- **"Stiff left atrial syndrome":** a fibrotic left atrium with raised filling pressure and congestion.
- **Bleeding** from anticoagulation, mainly intracranial and GI.

5. Stroke-risk assessment

- Use the **CHA₂DS₂-VASc** score for stroke risk and **HAS-BLED** for bleeding risk.
- Perceived AF burden does not predict stroke risk, so paroxysmal and persistent AF are managed the same way.

CHA ₂ DS ₂ -VASc		HAS-BLED	
Risk Criteria			
Congestive heart failure	1	Hypertension	1
Age >75	2	Abnormal renal or liver function	1 each
Hypertension	1	Stroke history	1
Diabetes mellitus	1	Bleeding diathesis	1
Prior stroke or TIA	2	Labile INR (on warfarin)	1
Vascular disease	1	Elderly (Age >65)	1
Age >65	1	Drugs that predispose to bleeding or alcohol	1 each
Sex category (F)	1		

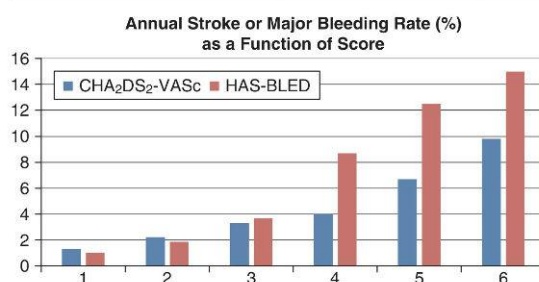


FIGURE 258-3 CHA₂DS₂-VASc and HAS-BLED systems. The CHA₂DS₂-VASc scoring system gives a point for each outlined stroke risk factor, whereas the HAS-BLED scoring system gives a point for each bleeding risk factor, as outlined in the table. In the chart below the table, the corresponding risk of stroke (CHA₂DS₂-VASc) or major bleed event (HAS-BLED) is plotted as a percent risk per annum as a function of score. F, female; INR, international normalized ratio; TIA, transient ischemic attack.

FIGURE 258-3 — reproduced from Harrison's 22e, p. 1950.

Table 1: CHA₂DS₂-VASc applied to this patient

Item	Points	This patient
Heart failure	1	0
Hypertension	1	1
Age >75	2	0
Diabetes	1	1
Stroke or TIA	2	0
Vascular disease	1	0
Age 65–74	1	1
Female	1	1
Total		4

- Anticoagulation is recommended for a score ≥ 1 , unless the lone factor is female sex.
- ESC 2024 uses CHA₂DS₂-VA, which drops the sex category. ICMR uses CHA₂DS₂-VASc.

6. Management of the 67-year-old

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflows: Cardiology (AF) · International: ESC/EACTS — 2024 AF Guidelines — 2024

- She is haemodynamically stable (BP 130/86), so emergent cardioversion is not needed.
- ESC 2024 framework **AF-CARE**: comorbidity and risk-factor management, avoid stroke, reduce symptoms by rate or rhythm control, evaluation and reassessment.
- **Anticoagulate**: start an oral anticoagulant, as ICMR advises. Her score is 4. DOACs are preferred for most patients. Aspirin alone is inadequate.
- **Rate control**: use a single drug, or a beta-blocker plus a calcium-channel blocker, as ICMR advises. The target is a resting rate <110 /min if asymptomatic with normal LV function.
- **Risk factors**: correct BP and glucose, and counsel on adherence. Non-compliance is the likely trigger.
- **Refer** if the rate stays uncontrolled, or if CHF or angina is present.

7. Acute rate-control drugs (EF 20%)

- Options in general are IV or oral **beta-blockers** or the calcium-channel blockers **verapamil or diltiazem**.
- With EF 20%, avoid verapamil and diltiazem. They have a negative inotropic effect.
- **Digoxin** lacks this effect and suits patients with cardiomyopathy prone to HF. It acts synergistically with beta-blockers.
 - Chronic use has been linked to increased mortality.
- Continue the beta-blocker cautiously. ICMR gives carvedilol as 3.125–25 mg twice daily.
- A beta-blocker plus diltiazem or verapamil should be used only under specialist advice.
- If there is haemodynamic compromise, pulmonary oedema or ischaemia, proceed to emergent cardioversion.

8. Further work-up of new-onset AF

- Suspect **tachycardia-induced cardiomyopathy**. The EF fell from 40% to 20% with rapid rates, and it is usually reversible with rate control.
- Reassess ventricular function periodically after rate control.
- Look for causes in the underlying disease. Susceptible conditions are coronary disease, valvular disease and HF with either depressed or preserved EF.
- Check the type of valve disease. **Rheumatic mitral stenosis** changes the choice of anticoagulant.
- **TEE or CT** for left atrial appendage thrombus before cardioversion.
- Score CHA₂DS₂-VASc and HAS-BLED.

9. Restore rhythm or control rate?

- **Favour rhythm control** here, because AF has depressed ventricular function and aggravates HF.
- In HF with depressed LV function, catheter-ablation-based rhythm control gives an all-cause mortality benefit over medical rhythm control.
- Early rhythm control (within 1 year) reduced cardiovascular death and stroke.
- AF has probably been present for about 3 months, which is >48 h. Either anticoagulate for 3 weeks before and at least 4 weeks after cardioversion, or exclude thrombus on TEE or CT first.
- Control the rate meanwhile. Lenient control (<110/min) is as effective as strict control in permanent AF.

10. Anticoagulation requirements

- CHA₂DS₂-VASc is **4** (HF, hypertension, age 65–74, female), so anticoagulation is indicated.
- Continue anticoagulation even after sinus rhythm is restored, because asymptomatic AF recurs.
- Stop relying on aspirin. It is inferior to warfarin and does not carry less bleeding risk.
- Choose a **DOAC** (dabigatran, rivaroxaban, apixaban or edoxaban), which is non-inferior to warfarin, with less intracranial bleeding.
- Use **warfarin** (INR >2) only for rheumatic mitral stenosis or a mechanical valve.

APIXABAN	EDOXABAN
5 mg bid	60 mg qd
2.5 mg bid	30 mg qd
At least 2 of 3 criteria: age ≥80 years, body weight ≤60 kg, or serum creatinine ≥1.5 mg/dL (133 μmol/L)	If any of the following: creatinine clearance 30–50 mL/min, body weight ≤60 kg, or concomitant use of dronedarone, cyclosporine, erythromycin, or ketoconazole

indicated for stroke prevention for atrial fibrillation. The standard dosing, reduced dosing,

TABLE 258-2 — reproduced from Harrison's 22e, p. 1951.

Table 2: DOAC doses

Drug	Standard	Reduced
Dabigatran	150 mg bid	110 mg bid
Rivaroxaban	20 mg qd	15 mg qd (CrCl 15–49 mL/min)
Apixaban	5 mg bid	2.5 mg bid (≥2 of: age ≥80 y, weight ≤60 kg, creatinine ≥1.5 mg/dL)
Edoxaban	60 mg qd	30 mg qd

- If a DOAC is contraindicated for bleeding, consider left atrial appendage closure.

11. Maintaining sinus rhythm after cardioversion

- **Catheter ablation (pulmonary vein isolation)** is first-line, especially in paroxysmal AF, and is superior to drugs.
 - About 80% remain in sinus rhythm at 1 year after one procedure.
 - Efficacy is lower in persistent AF.
- **Amiodarone**: maintains sinus rhythm in about two-thirds and can be given in HF and coronary disease. Over 40% develop toxicity, so monitor skin, liver, lung and thyroid.

- **Sotalol or dofetilide:** usable in structural heart disease, with a ~3% risk of torsades. Start in hospital with ECG monitoring.
- **Avoid in her:** class I agents (flecainide, propafenone), which are harmful in HF or coronary disease, and dronedarone, which raises mortality in HF.
- Beta-blockers and calcium-channel blockers are low-risk but have low efficacy for preventing AF.

PEARLS

- AF is diagnosed from an **irregularly irregular pulse** and confirmed on **ECG**.
- AF >48 h or of unknown duration: 3 weeks of anticoagulation, or exclude thrombus on TEE or CT, before cardioversion.
- Anticoagulate by **CHA₂DS₂-VASc ≥1**, not by AF burden. **DOAC** is preferred. **Warfarin** is for rheumatic mitral stenosis or a mechanical valve.
- Adequate rate control is a resting rate <80/min. A lenient target of <110/min is acceptable.
- With low EF, avoid verapamil, diltiazem, class I drugs and dronedarone. Ablation is first-line for rhythm control.

Web sources: [W1] ICMR — Standard Treatment Workflows: Cardiology (AF, heart failure) — https://www.icmr.gov.in/icmrobject/uploads/STWs/1771492083_cardiology_all.pdf · [W2] ESC/EACTS — 2024 ESC Guidelines for the management of atrial fibrillation — 2024 — <https://academic.oup.com/eurheartj/article/45/36/3314/7738779>

4. Heart failure in a diabetic/post-MI patient – diagnosis, precipitants, signs, management, prevention

ASKED 3* · 10-mark answer

Asked in: Dec 2021 · Paper I · Q1 (10 marks) · Jun 2022 · Paper I · Q10 (10 marks) · Oct 2023 · Paper I · Q4 (10 marks)

Q (Dec 2021 · Paper I · Q1): A 65-year-old man with type 2 diabetes mellitus with past history of acute myocardial infarction 5 years ago, presented to you with dyspnoea on exertion, fatigue, swelling legs and decreased urine output for 5 days duration. He is finding it difficult to sleep at night and wakes up due to breathing difficulty and gets relief after sitting up for sometime. a) What is your probable diagnosis for the presenting symptoms? Explain the clinical features and pathophysiology? [4] b) How will you manage this patient? [4] c) What is the role of family physician in prevention of this condition? [2]

Q (Jun 2022 · Paper I · Q10): A 50 year old male known to have diabetes and hypertension for 15 years. He had history of acute coronary syndrome a year ago. Now comes to you with fatigue, decreased food intake and dyspnea on exertion. Clinically pedal edema, elevated JVP and on bilateral auscultation of the lung bases, he had fine crepitations. What clinical possibilities will you entertain? How do you proceed to evaluate this patient? As a family physician, how will you manage this case? [10]

Q (Oct 2023 · Paper I · Q4): A 56-year-old male presented to OPD with complaints of swelling of feet and breathing difficulty which has been increasing over the past 8 weeks. He is a diabetic and hypertensive: a) What are the precipitating causes of cardiac failure? [2] b) What are the signs of left and right heart failure? [2] c) What investigations you would want to perform? [2] d) What are the nonpharmacological and pharmacological managements? [4]

SOURCE HAR — Ch. 264 Heart Failure: Pathophysiology and Diagnosis — pp. 1975, 1981, 1983–1984 · MUR — Chronic heart failure — pp. 891–893, 897

Probable diagnosis, clinical features and pathophysiology

- **Probable diagnosis: chronic heart failure (HF) with reduced ejection fraction, most likely ischaemic cardiomyopathy.** This is a diabetic man with a previous MI who now has exertional dyspnoea, fatigue, leg swelling and orthopnoea or paroxysmal nocturnal dyspnoea (PND). Ischaemic heart disease causes about two-thirds of systolic HF.
- HF is a clinical syndrome: structural or functional impairment of ventricular filling or ejection produces symptoms and signs.
- **Symptoms:**
 - Dyspnoea progresses from exertional to rest dyspnoea, then orthopnoea, then PND.
 - Other features are fatigue, ankle oedema, nocturnal dry cough and abdominal discomfort from hepatic congestion.
 - Dizziness, weakness and syncope reflect poor output.
 - Nocturia and oliguria suggest advanced disease.
- **Pathophysiology:**

- Falling cardiac output unloads baroreceptors, which raises sympathetic tone, vasopressin and renin–angiotensin–aldosterone activity.
- The result is salt and water retention, vasoconstriction, myocyte hypertrophy, cell death and fibrosis. This maintains perfusion in the short term but remodels the heart.
- Venous congestion worsens renal function (cardiorenal syndrome).

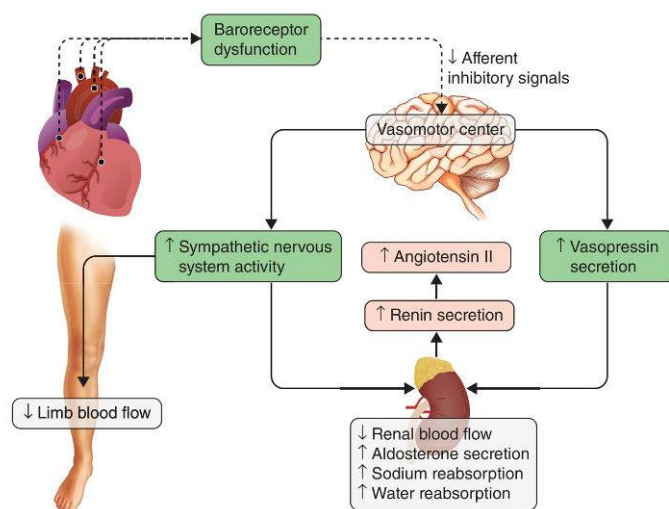


FIGURE 264-7 Activation of neurohormonal systems in heart failure. Decreased cardiac output in heart failure (HF) results in an “unloading” of high-pressure baroreceptor (circles) in the left ventricle, carotid sinus, and aortic arch, which in turn causes reduced parasympathetic tone. This decrease in afferent inhibition results in a generalized increase in efferent sympathetic tone and nonosmotic release of arginine vasopressin from the pituitary. Vasopressin is a powerful vasoconstrictor that also leads to reabsorption of free water by the kidney. Afferent signals to the central nervous system also activate sympathetic innervation of the heart, kidney, peripheral vasculature and skeletal muscles. Sympathetic stimulation of the kidney leads to the release of renin, with a resultant increase in circulating levels of angiotensin II and aldosterone. The activation of the renin–angiotensin–aldosterone system promotes salt and water retention, peripheral vasoconstriction, myocyte hypertrophy, cell death, and myocardial fibrosis. Although these neurohormonal mechanisms facilitate short-term adaptation by maintaining blood pressure and organ perfusion, they also result in end-organ changes in the heart and circulation. (Modified from A Nohria et al: *Atlas of Heart Failure: Cardiac Function and Dysfunction*, 4th ed, WS Colucci [ed]. Philadelphia, Current Medicine Group, 2002, p. 104, and J Hartupsee, DL Mann: *Nat Rev Cardiol* 14:30, 2017.)

FIGURE 264-7 — reproduced from Harrison's 22e, p. 1981.

Management of this patient

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflows: Cardiology (heart failure) · International: ESC — 2021 HF Guidelines with 2023 Focused Update — 2023

- Confirm the diagnosis with an ECG and echocardiography, which is the investigation of choice for ventricular function.
- Look for and correct precipitants, such as ischaemia, arrhythmia, anaemia or NSAID use.
- Decongest with a loop diuretic. Give 20–80 mg daily orally, or 10–80 mg IV SOS in the acute stage, then switch to oral. Monitor electrolytes, creatinine and uric acid.
- Add a beta-blocker (carvedilol 3.125–25 mg twice daily) and up-titrate every 1–2 weeks to the maximum tolerated dose.
- Add an ACE inhibitor or ARB, and an aldosterone antagonist if symptoms persist.
- Add an SGLT2 inhibitor, which has a Class 1A recommendation. It also suits this diabetic patient.
- Refer if there is acute decompensation or refractory symptoms (see the refer box below).

Role of the family physician in prevention

- Prevention matters because the prognosis is poor once HF is established: about 50% of patients die within 5 years of diagnosis.
- **Primary prevention:** HF is the final pathway of hypertension, coronary disease and valvular disease. Treat these early.
- Hypertension:
 - Treat to the ICMR target of SBP <130 and DBP <80 mmHg in patients with CVD.
 - Do annual creatinine, urine, lipid and fundus checks.
- **Secondary prevention after MI:**
 - Use a high-dose statin (atorvastatin 80 mg or rosuvastatin 20–40 mg).
 - Add an ACE inhibitor (ramipril 2.5–10 mg once daily).

- Continue dual antiplatelets for at least 1 year after ACS.
- Control diabetes and screen for HF risk using the history and examination.
- **Tertiary prevention:** educate patients, use a multidisciplinary approach and detect decompensation early.

Clinical possibilities, evaluation and primary-care management (50-year-old, ACS a year ago)

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflows: Cardiology (heart failure) · International: ESC — 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure, with the 2023 Focused Update — 2021 / 2023

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: chronic HF, usually ischaemic with hypertensive or diabetic contribution.
- Serious disorders not to be missed: recurrent ischaemia or MI, atrial fibrillation or other persistent arrhythmia, valvular regurgitation, severe anaemia and thyrotoxicosis. Pulmonary embolism and worsening renal or hepatic failure also precipitate HF.
- Pitfalls: cough from left ventricular failure can be mistaken for asthma, bronchitis or ACE-inhibitor cough. A normal chest X-ray does not exclude HF. Wheeze can lead to a wrong diagnosis of asthma or COPD.
- Masquerades: asthma and COPD, DVT or lymphoedema for oedema, and constrictive pericarditis or primary liver disease when ascites is massive.
- Is the patient trying to tell me something?: Poor appetite and fatigue may reflect bowel and hepatic congestion or cardiac cachexia, not only "ageing".
- Indian layer: the ICMR workflow lists the acute precipitants to treat, including salbutamol use and hyperkalaemia. Check diabetes control, creatinine, urine and lipids in a hypertensive patient.
- **Differentials of pedal oedema with basal crepitations:** HF, HFpEF, renal failure, hepatic disease, constrictive pericarditis, severe anaemia and pneumonia. Also consider ischaemia in a patient with prior ACS.
- Evaluation follows Part 7 below. Echocardiography is the key test.
- **Management at primary care:**

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflows: Cardiology (heart failure) · International: ESC — 2021 HF Guidelines with 2023 Focused Update — 2023

- Stratify severity by NYHA class: I–IV, with approximate 1-year mortality of 5%, 10%, 20% and 50%.
- Start the drug plan in Part 8. Avoid NSAIDs and the negative-inotrope calcium channel blockers.
- Follow-up: weigh at each visit, check electrolytes and kidney function, and watch for hyperkalaemia with the drug combination.
- Involve the family in diet, adherence and early reporting of weight gain.

REFER WHEN

- Uncertain diagnosis, especially diastolic HF
- Acute decompensation or refractory symptoms
- Complex management with beta-blockers or digoxin
- Need for device implantation or transplant assessment
- Uncontrolled heart rate, or HF with angina (ICMR AF workflow)

Precipitating causes of cardiac failure

Table 1: Precipitating factors

Group	Examples
Patient-related	Excess exertion or stress, excess fluid or sodium, non-adherence, heavy alcohol
Provider-related	NSAIDs, negative inotropes (CCBs), inadequate diuretics
HF-related	Uncontrolled hypertension, ischaemia or MI, arrhythmias, pulmonary embolism
Other diseases	Infection, renal or hepatic failure, hyperthyroidism, sleep apnoea, anaemia

Signs of left and right heart failure

Table 2: Signs of left and right heart failure

Left HF	Right HF
Tachycardia, tachypnoea	Raised JVP, hepatojugular reflux
Low-volume pulse, pulsus alternans	Right ventricular heave
Displaced apex, S3 gallop	Peripheral pitting oedema
Bilateral basal crackles	Tender hepatomegaly, ascites
Pleural effusion, cool pale extremities	Bilateral effusions, jaundice in severe disease

Investigations

• First line:

- Do CBC, metabolic panel (electrolytes, creatinine), urinalysis, and assessment for diabetes, lipids and thyroid function.
- Do a chest X-ray (cardiomegaly, upper-lobe diversion, Kerley B lines, effusions).
- Do an ECG for ischaemia, arrhythmia and LV hypertrophy.
- Do a natriuretic peptide (BNP) test for severity and prognosis.
- Do echocardiography to separate systolic from diastolic dysfunction.

• Selective: coronary angiography for angina or ischaemia, CMR or CT, and endomyocardial biopsy.

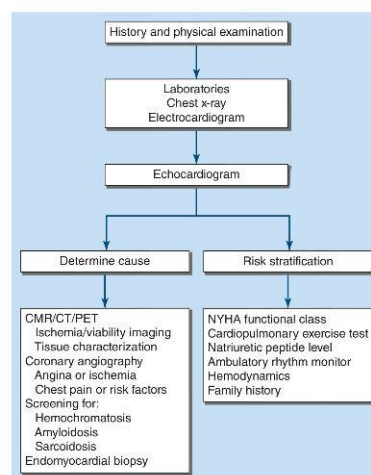


FIGURE 264-8 Initial assessment of patients presenting with heart failure. The initial evaluation starts with a thorough history and physical examination, focusing on detection of comorbidities including hypertension, diabetes, and hyperlipidemia. In addition, identification of valvular heart disease, vascular disease, history of mediastinal radiation, or exposure to cardiotoxins (e.g., chemotherapy, alcohol, or illicit drugs) may help determine underlying cause. A family history of sudden death, heart failure, arrhythmias, or cardiomyopathy is also useful. Routine laboratory evaluation (see text) should also be performed. Chest x-ray is useful to detect cardiomegaly and fluid overload and to rule out pulmonary disease. A 12-lead electrocardiogram should be performed to detect abnormalities of cardiac rhythm and conduction, left ventricular hypertrophy, and evidence of myocardial ischemia or infarction. Two-dimensional echocardiography with Doppler imaging is indicated to assess cardiovascular structure and function and detect abnormalities of the myocardium, heart valves, or pericardium. Further imaging and laboratory studies aimed at identifying a specific cause of cardiomyopathy depend on information obtained from the history and physical examination. In all patients, risk stratification should be performed to assess severity of illness, guide therapy, and provide prognosis to patient and family. CMR, cardiac magnetic resonance imaging; CT, computed tomography; NYHA, New York Heart Association; PET, positron emission tomography.

FIGURE 264-8 — reproduced from Harrison's 22e, p. 1984.

Non-pharmacological and pharmacological management

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflows: Cardiology (heart failure) · International: ESC — 2021 HF Guidelines with 2023 Focused Update — 2023

- **Non-pharmacological:**
 - Treat the cause and remove precipitants.
 - Educate the patient and give general measures. Restrict sodium and fluid, and avoid alcohol and NSAIDs.
 - Use a multidisciplinary team.

Table 3: Pharmacological management

Drug	Dose and role
Loop diuretic	20–80 mg daily orally; IV 10–80 mg SOS
Beta-blocker (carvedilol)	3.125–25 mg twice daily, up-titrated every 1–2 weeks
ACE inhibitor or ARB	Gold standard in systolic HF
Aldosterone antagonist	Added if symptoms persist
SGLT2 inhibitor	Class 1A; also the only class shown to help HFpEF

- Avoid excess loop-diuretic reliance, excessive ACE-inhibitor loading doses, and neglect of electrolyte monitoring.

PEARLS

- HF is a clinical syndrome of impaired ventricular filling or ejection.
- Hallmarks are orthopnoea, PND, raised JVP and basal crackles.
- Echocardiography is the investigation of choice.
- Foundation therapy is a diuretic, a beta-blocker, an ACE inhibitor or ARB, an aldosterone antagonist and an SGLT2 inhibitor.
- Trap: left HF cough or wheeze is mistaken for asthma.
- Look for a precipitant in every decompensation.

Web sources: [W1] ICMR — Standard Treatment Workflows: Cardiology (heart failure and AF) — https://www.icmr.gov.in/icmrobject/uploads/STWs/1771492083_cardiology_all.pdf · [W2] ESC — 2021 HF Guidelines with 2023 Focused Update — 2023 — <https://pmc.ncbi.nlm.nih.gov/articles/PMC10485024/> · [W3] ICMR — Standard Treatment Workflow: Hypertension in Adults — https://www.icmr.gov.in/icmrobject/uploads/STWs/1778941063_hypertensioninadults_final.pdf · [W4] ICMR — Standard Treatment Workflow: STEMI — https://www.icmr.gov.in/icmrobject/uploads/STWs/1768823342_cardiology_1-5.pdf

5. Hypertensive heart failure with anaemia – problem list & referral

ASKED 1* · 10-mark answer

Asked in: May 2024 · Paper I · Q1(a,b,d) (8 marks)

Q (May 2024 · Paper I · Q1(a,b,d)): A 52-year-old male presented to you with complaints of progressive dyspnea on exertion for the past 2 months. He has never consulted a doctor so far in the past two months. He reports bleeding per rectum in the past two months for which he took native treatment from traditional healers. On examination, his face is puffy and significant pallor is present. There is bilateral pitting pedal edema and Jugular Venous Pulse is elevated. His pulse rate is 110 per minute and regular in rhythm. His blood pressure is 210/100 mmHg in the right upper limb. His BMI is 35 Kg/m². a) Write a problem list and provisional diagnosis for this patient. [2] b) What are the possible etiological factors contributing to the clinical picture? [2] d) As a family doctor, how will you manage this patient in your practice? Mention two indications for referral to the specialist. [4]

SOURCE HAR — Ch. 284 Ischemic Heart Disease — p. 2091 · MUR — Chronic heart failure (ch. 75) — pp. 891, 893, 896–897

Problem list and provisional diagnosis

Table 1: Problem list

Problem	Basis
Progressive exertional dyspnoea, 2 months	Dyspnoea on exertion is the classic symptom of heart failure
Rectal bleeding for 2 months, untreated (native healers)	Chronic blood loss; source not yet identified
Significant pallor	Anaemia; severe anaemia may itself cause heart failure
Raised JVP, bilateral pitting pedal oedema	Right-heart failure signs
Tachycardia 110/min, regular	Left-heart failure sign; also compensation for anaemia
BP 210/100 mmHg	Grade 3 hypertension; hypertensive emergency must be excluded at $\geq 180/110$
BMI 35 kg/m ²	Obesity, a risk factor for hypertension and HFpEF
Puffy face	Needs exclusion of renal disease and hypothyroidism (urine, creatinine, TSH)
Delayed care, harmful beliefs	Needs counselling

- **Provisional diagnosis:** congestive heart failure (biventricular) due to hypertensive heart disease, precipitated or aggravated by severe anaemia from chronic lower-GI blood loss.
- Complications are likely: hypertensive target-organ damage (kidney, retina) and possible ischaemia.
- The heart failure type (HFrEF or HFpEF) is decided by echocardiography.

Possible aetiological factors

- **Underlying cardiac causes:**
 - Essential hypertension is a common cause.
 - Ischaemic heart disease is the commonest cause of systolic failure.
 - Obesity, hypertension and diabetes are risk factors for diastolic failure (HFpEF).
- **Anaemia, a high-output state:**
 - Anaemia can precipitate heart failure.
 - Severe anaemia lowers the threshold for ischaemia in patients with coronary obstruction.
 - The source of bleeding needs evaluation, for example haemorrhoids or a colorectal lesion.
- **Raised oxygen demand:** left ventricular hypertrophy from hypertension, with coronary atherosclerosis and anaemia, can coexist.
- **Atherosclerosis risk factors:** LDL, smoking, hypertension and diabetes. Obesity adds to these.
- **Other contributors to exclude:**
 - Persistent arrhythmia, especially AF
 - Thyroid disease
 - Valvular disease
 - Alcohol
- **Renal disease:** the puffy face and high BP may reflect CKD, which causes both hypertension and anaemia.
- **Precipitating factors:** delay in seeking care and no antihypertensive treatment.

Management in practice

MANAGEMENT BASIS

India: ICMR — STW Hypertension in Adults; ICMR — STW Cardiology (heart failure) · International: ESC — 2024 hypertension guideline — 2024; MUR 9e, ch. 75 (heart failure)

First-contact actions

- Check airway, breathing and circulation, SpO₂, and repeat BP in both arms. Diagnosis needs at least 2 measurements on a validated device.

- Look for hypertensive emergency: encephalopathy, chest pain, pulmonary oedema, neurological deficit and fundal changes. At $\geq 180/110$ mmHg an emergency must be excluded.
- Examine per rectum and with a proctoscope for the bleeding source. Check for melaena.
- Sit the patient upright and give oxygen if hypoxic.

Investigations (bedside and first-line)

- Haemoglobin and blood film, ECG, chest X-ray and echocardiography. Echocardiography is the investigation of choice.
- Electrolytes, kidney function and urinalysis; thyroid function tests if AF is present.
- Blood glucose or HbA1c, lipid profile, serum creatinine, urine albumin and fundoscopy.
- Stool occult blood and, later, colonoscopy for the bleeding source.
- BNP is an indicator of severity and prognosis.

Treatment

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflows: Cardiology (heart failure workflow) — ICMR — Standard Treatment Workflow: Hypertension in Adults · International: ESC — 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure, with the 2023 Focused Update — 2021 / 2023

- Treat the cause, remove precipitants (anaemia, bleeding), educate, and add non-drug measures. The approach is multidisciplinary.
- **Non-drug measures:**
 - Salt restriction, weight reduction, exercise as tolerated, and stopping tobacco and alcohol.
 - Daily weights.
- **Congestion:**
 - Loop diuretic 20–80 mg daily orally, switching from IV to oral when symptoms subside. Monitor electrolytes, creatinine and uric acid.
 - Murtagh's dosing is furosemide 20–40 mg once or twice daily; closely monitor weight, kidney function and electrolytes.
 - Do not over-rely on loop diuretics.
- **Hypertension and HFrEF drugs:**
 - Start an ACEI/ARB (or ARNI) with an MRA and an SGLT2 inhibitor. Add a heart-failure beta blocker once euvolaemic.
 - First-line antihypertensives in India are CCB, ACEI/ARB and thiazide or thiazide-like diuretic.
 - IHCI starts amlodipine 5 mg (telmisartan if CKD) and reviews every 30 days.
 - Carvedilol 3.125–25 mg twice daily. Up-titrate every 1–2 weeks to the maximum tolerated dose.
 - Watch for hyperkalaemia with the ACEI/MRA combination.
 - SGLT2 inhibitor: Class 1A in heart failure per ESC 2023. Take care when combining it with a loop diuretic.
 - Avoid an excessive loading dose of ACEI.
- **BP target:** for patients with CVD, SBP <130 and DBP <80 mmHg if tolerated.
- **Anaemia:** find and treat the bleeding source, and correct the anaemia through the referral pathway.
- **Follow-up:**
 - Review every 2–4 weeks with BP and side-effect checks.
 - Titrate drugs.
 - Repeat echocardiography at 3–6 months.
 - Counsel on adherence and on avoiding native remedies, and involve the family.

REFER WHEN

- Acute decompensation, for example pulmonary oedema or a hypertensive emergency.
- Refractory symptoms, or complex management issues (beta blockers, digoxin).
- Uncertain diagnosis, especially diastolic failure.
- Severe anaemia needing transfusion, or rectal bleeding needing colonoscopy or surgery.
- Suspected CKD or secondary hypertension.

PEARLS

- Exertional dyspnoea, raised JVP and oedema with severe hypertension and anaemia point to hypertensive heart failure with a high-output component.
- Anaemia can both cause and aggravate heart failure.
- Echocardiography is the investigation of choice.
- Treat congestion with a loop diuretic, then add an ACEI/ARB, MRA, SGLT2 inhibitor and beta blocker.
- Exclude hypertensive emergency at BP $\geq 180/110$ mmHg.
- Exam trap: always ask about and examine for the bleeding source, and do not attribute everything to heart failure.

Web sources: [W1] ICMR — Standard Treatment Workflow: Hypertension in Adults — https://www.icmr.gov.in/icmrobject/uploads/STWs/1778941063_hypertensioninadults_final.pdf · [W2] NP-NCD / ICMR-NIE — India Hypertension Control Initiative protocol — <https://pmc.ncbi.nlm.nih.gov/articles/PMC10959138/> · [W3] ICMR — Standard Treatment Workflows: Cardiology (heart failure) — https://www.icmr.gov.in/icmrobject/uploads/STWs/1771492083_cardiology_all.pdf · [W5] ESC — 2021 Heart Failure Guidelines with 2023 Focused Update — <https://pmc.ncbi.nlm.nih.gov/articles/PMC10485024/>

6. Shoulder pain as angina – effort & unstable angina management

ASKED 1* · 10-mark answer

Asked in: Apr 2023 · Paper I · Q8 (10 marks)

Q (Apr 2023 · Paper I · Q8): A 70-year-old lady presents with pain of the left shoulder for the 2 weeks. She is a diabetic and a hypertensive. a) List the differential diagnosis. [2] b) You suspect that she could be having coronary heart disease. How will you investigate to confirm this? [3] c) Outline the management of effort angina and unstable angina. [5]

SOURCE MUR — Chest pain — pp. 359, 364, 368, 369, 380 · HAR — ch. 284 Ischemic Heart Disease; ch. 285 NSTEMI-ACS — pp. 2093, 2098, 2103, 2107

Differential diagnosis of left shoulder pain in a diabetic, hypertensive 70-year-old woman

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: In the elderly, chest pain is most likely angina or myocardial infarction. Angina can be atypical in women and diabetics, so shoulder or arm pain can be an ischaemic equivalent. Ischaemic pain can also be referred from the spine, which gives almost identical pain.
- Serious disorders not to be missed: ACS (MI, unstable angina), pulmonary embolism, aortic dissection, tension pneumothorax and oesophageal rupture. Pericarditis and aortic stenosis are also listed.
- Pitfalls: Unrecognised MI is atypical or silent, and is more common with diabetes, hypertension, old age and female sex. Anginal "equivalents" (dyspnoea, nausea, fatigue, faintness) are commoner in the elderly and diabetics. Pain reproduced by palpation lowers, but does not exclude, the chance of AMI.
- Masquerades: Oesophageal reflux or spasm can radiate to the left arm. Others are peptic ulcer, biliary colic, herpes zoster, costochondritis and cervical or thoracic spinal dysfunction.
- Is the patient trying to tell me something?: Stress, anxiety and depression cause psychogenic chest pain.
- Indian layer: Initial evaluation aims to identify ACS, aortic dissection and PE quickly, with a 12-lead ECG and high-sensitivity troponin. The ICMR STW list for chest pain gives no separate Indian differential.

Table 1: Differential diagnosis (cardiac first)

Group	Conditions
Cardiac	Stable angina, unstable angina, NSTEMI/STEMI, pericarditis, aortic stenosis
Vascular/pulmonary	Aortic dissection, PE, pneumothorax, pleurisy
Musculoskeletal/spine	Cervical or thoracic dysfunction, chest wall pain, costochondritis
GI	Reflux, oesophageal spasm, peptic ulcer, biliary colic
Infective/functional	Herpes zoster; anxiety, hyperventilation

Investigations to confirm coronary heart disease

- History establishes IHD until proven otherwise. Ask about exertional provocation, relief by rest or nitrate within 1–5 min, and pain at rest or with less effort (unstable).
- Examine for risk factors and other arterial disease (bruits, weak leg pulses, arm–leg BP difference, fundi), and for anaemia and thyroid disease.
- Examination during an attack may show S3/S4, mitral regurgitation or pulmonary oedema.

Table 2: Investigations

Test	Finding	Interpretation
12-lead ECG (at once, and during pain)	ST depression/elevation, new LBBB, Q waves	ST elevation = STEMI; depression = NSTEMI-ACS
High-sensitivity troponin	Rise and fall	Raised = NSTEMI/STEMI; not raised = unstable angina
Exercise stress test (stable pain, ECG normal)	ST depression ≥ 0.1 mV before stage II of the Bruce protocol; inability to exercise 6 min	Positive; high risk
Stress echo or perfusion imaging	Wall-motion or perfusion defect; fall in EF	Ischaemia; high risk
Resting echo	LV function, EF < 0.40	Prognosis
CT/CMR angiography	Anatomy, non-invasively	Alternative to angiography; CT gives higher radiation
Coronary arteriography	Site and severity of stenosis	For revascularization planning or when diagnosis is doubtful

- Risk-factor work-up: fasting glucose or HbA1c, serum creatinine, urine albumin, lipid profile, fundoscopy.
- Also check Hb and thyroid status, as anaemia and thyrotoxicosis can provoke angina.

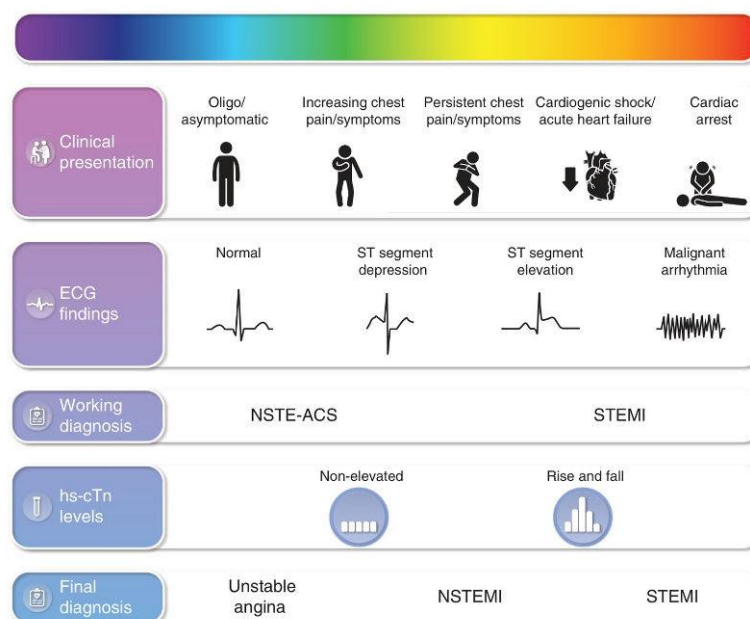
**FIGURE 285-1 Spectrum of acute coronary syndromes.** The spectrum of clinical presentations, electrocardiographic findings, and high-sensitivity cardiac troponin levels

FIGURE 285-1 — reproduced from Harrison's 22e, p. 2107.

Management of effort angina and unstable angina

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflows (Hypertension; STEMI) · International: ACC/AHA — 2025 ACS Guideline — 2025; HAR 22e ch. 284–285

Effort (stable) angina

- Plan has six components: explanation and reassurance, treating aggravating conditions, activity adaptation, risk-factor treatment, drug therapy for angina, and consideration of revascularization.
- Treat aggravating conditions: anaemia, thyroid disease, arrhythmia and heart failure.
- Risk factors:
 - Stop smoking and control diabetes.
 - BP target in CVD is <130/80 mmHg if tolerated.
 - Lipids: high-intensity statin, e.g. atorvastatin 80 mg OD, as used in the ICMR STW.
- Aspirin 100–300 mg daily indefinitely; clopidogrel 75 mg daily if aspirin is contraindicated.
- Sublingual nitroglycerin for attacks; it relieves exertional angina within minutes.
- Beta blocker is the usual anti-anginal. ACE inhibitor is given in diabetes, hypertension or reduced EF.
- Second-line agents:
 - Nicorandil 20 mg twice daily.
 - Ivabradine 2.5–7.5 mg twice daily, only if resting HR ≥ 70 /min with LV systolic dysfunction.
- Avoid NSAIDs in IHD. If unavoidable, co-prescribe aspirin at the lowest dose for the shortest time.
- Refer for coronary arteriography if there are high-risk features: low exercise capacity, EF <40%, ACS presentation, or uncontrolled symptoms.
- PCI suits one- or two-vessel disease. CABG is better for left main or three-vessel disease, especially with diabetes or impaired LV function.

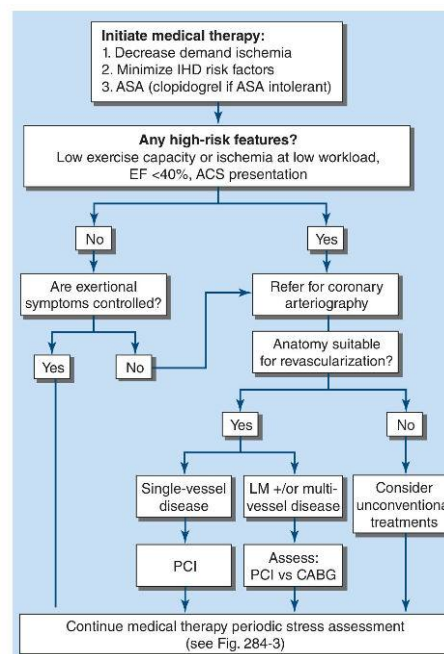


FIGURE 284-4 Algorithm for management of a patient with ischemic heart disease. All patients should receive the core elements of medical therapy as shown at the top of the algorithm. If high-risk features are present, as established by the clinic history, exercise test data, and imaging studies, the patient should be referred for coronary arteriography. Based on the number and location of the diseased vessels and their suitability for revascularization, the patient is treated with a percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG) surgery or should be considered for unconventional treatments. See text for further discussion. ACS, acute coronary syndrome; ASA, aspirin; EF, ejection fraction; IHD, ischemic heart disease; LM, left main.

FIGURE 284-4 — reproduced from Harrison's 22e, p. 2103.

Unstable angina (NSTEMI-ACS)

- Unstable angina means increasing angina, angina at rest or with less effort, or new-onset angina.
- Treat as an emergency: admit to a monitored bed with ECG and troponin. Risk-stratify with the TIMI score (0/1 markers = 5% adverse events at 14 days; 6/7 = 41%).
- Antiplatelets:
 - Dual antiplatelet therapy: aspirin plus ticagrelor or prasugrel, preferred over clopidogrel when PCI is done.
 - Continue for at least 12 months unless bleeding risk is high.
 - ICMR STW doses: ticagrelor 180 mg load then 90 mg BD; prasugrel 60 mg load then 10 mg OD.
- Anticoagulation: unfractionated heparin 60 U/kg bolus (maximum 5000 U), then 12 U/kg/h, keeping APTT 50–70 sec.
- Anti-ischaemic:
 - IV nitroglycerin 5–25 mcg/min.
 - Morphine 2–4 mg IV, titrated, for refractory pain.
 - Oral beta-blocker if LVEF <40%.
- Statin: atorvastatin 80 mg OD or rosuvastatin 20–40 mg OD. Add non-statin drugs if LDL-C stays above 70 mg/dL on maximum statin.
- ACE inhibitor: ramipril 2.5–10 mg OD or enalapril 2.5–10 mg BD.
- Early angiography and revascularization for high-risk features. Refractory pain or instability needs transfer to a PCI-capable centre.
- Long-term: ACE inhibitor indefinitely; continue beta blocker beyond 12 months if EF <40% or ongoing angina.

PEARLS

- Angina in diabetic women can be atypical (shoulder, arm, dyspnoea); do an ECG for every such patient.
- Pain reproduced by palpation does not exclude ACS.
- Stable angina: relieved in 1–5 min by rest or sublingual nitroglycerin; pain not responding to these makes the diagnosis suspect.
- Unstable angina: troponin not raised; NSTEMI: troponin raised without ST elevation.
- Aspirin 100–300 mg plus a P2Y₁₂ inhibitor for ≥12 months in ACS.
- Avoid NSAIDs in IHD.

Web sources: [W1] AHA/ACC — 2021 Guideline for the Evaluation and Diagnosis of Chest Pain — 2021 — <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11308083/> · [W2] ICMR — Standard Treatment Workflow: Hypertension in Adults — https://www.icmr.gov.in/icmrobject/uploads/STWs/1778941063_hypertensioninadults_final.pdf · [W3] ICMR — Standard Treatment Workflow: STEMI — https://www.icmr.gov.in/icmrobject/uploads/STWs/1768823342_cardiology_1-5.pdf · [W4] ACC/AHA/ACEP/NAEMSP/SCAI — 2025 Guideline for the Management of Patients With Acute Coronary Syndromes — 2025 — <https://www.ahajournals.org/doi/10.1161/CIR.0000000000001309>

7. Acute chest pain / STEMI – diagnosis, ECG, initial & definitive management

ASKED 2★ · 10-mark answer

Asked in: Dec 2021 · Paper I · Q7 (10 marks) · Jun 2025 · Paper I · Q2 (10 marks)

Q (Dec 2021 · Paper I · Q7): A 50-year-old male, smoker with type 2 diabetes for past 5 years, presented to the emergency department with sudden onset left sided chest pain for past 1 hour with associated autonomic symptoms. His pulse rate is 120 per minute and blood pressure is 190/110 mmHg. His oxygen saturation is 99%. a) What is your diagnosis and how will you confirm the diagnosis? [3] b) How will you manage this man today in the emergency department? [3] c) What are the causes of chest pain and how will you clinically evaluate any patient with chest pain? [4]

Q (Jun 2025 · Paper I · Q2): A 52-year-old gentleman was brought to the OPD with chest discomfort since this morning. He has no comorbidities. a) What initial assessment will you perform? [2] b) Write the findings in ECG consistent with ST Elevation Myocardial Infarction (STEMI). [3] c) What is the initial management you provide for STEMI? [2] d) Mention the definitive management in STEMI and Non STEMI. [3]

SOURCE HAR — ch.286 ST-Segment Elevation Myocardial Infarction — pp. 2113–2115, 2118 · MUR — Presenting symptoms and problem solving; Chest pain — pp. 364, 375

1. Diagnosis and confirmation

- **Diagnosis: acute STEMI (acute coronary syndrome)** until proven otherwise. The patient is a smoker and diabetic, with pain for 1 hour and autonomic symptoms.
 - Chest pain lasting >30 min with diaphoresis strongly suggests STEMI.
 - Pulse 120/min and BP 190/110 fit sympathetic hyperactivity, which is seen in anterior infarction.
 - The 12-lead ECG is the pivotal triage tool. It separates ST-elevation from non-ST-elevation presentations.
- **Confirmation:**
 - 12-lead ECG immediately. ST-elevation means STEMI, and treatment must not wait for biomarkers.
 - Cardiac troponin, with at least one value above the 99th percentile. Acute MI also needs ischaemic symptoms, new ischaemic ECG changes, new Q waves or imaging evidence.
 - Bedside echocardiography and the rest of the work-up are selective tests.
- **Exclude mimics:** aortic dissection (check for pulse inequality), pericarditis and pulmonary embolism.

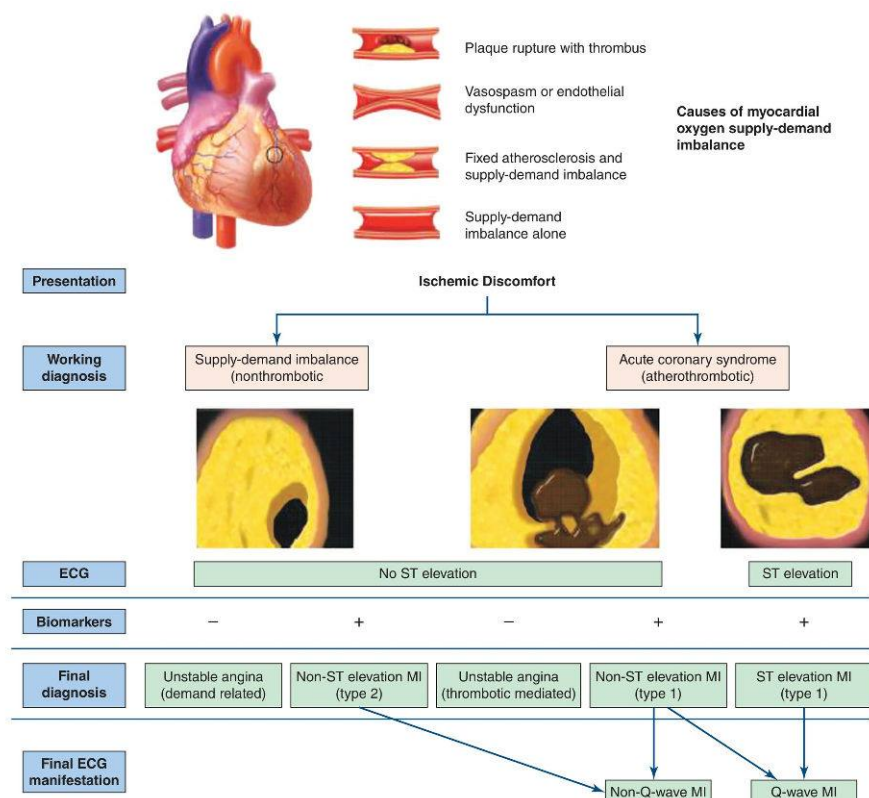


FIGURE 286-1 Acute coronary syndromes. Following disruption of a vulnerable plaque, patients experience ischemic discomfort resulting from a reduction of flow through the affected coronary artery.

FIGURE 286-1 — reproduced from Harrison's 22e, p. 2114.

2. How will you manage this man today in the emergency department?

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflow: STEMI · International: HAR 22e ch.286 (ESC 2023 / ACC-AHA 2025 ACS)

- Shift to a monitored resuscitation bay, secure an IV line, and send troponin with the first blood sample.
- **Aspirin** 160–325 mg chewed, then 75–162 mg daily.
- **Oxygen is not needed** at SpO₂ 99%. Give it only if SpO₂ <90%.
- **Sublingual nitroglycerin** 0.4 mg, up to 3 doses 5 min apart.
 - Avoid it if SBP <90 mmHg, if RV infarction is suspected, or after a PDE-5 inhibitor within 24 h.
 - It also lowers his BP of 190/110. Start IV nitroglycerin if pain recurs.
 - India: IV infusion 5–25 mcg/min.
- **Analgesia:** morphine 2–4 mg IV in small repeated doses. HAR gives it every 5 min; the ICMR workflow says every 15 min, titrated.



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HOW TO USE

Each answer groups every year and paper in which the question was asked ("Asked in") and answers the union of the parts asked. The badge shows how often it was asked. The SOURCE line under the questions names the book chapters and pages and the guideline documents used. Amber MANAGEMENT BASIS strips name the Government of India document first, then the international one. Slate boxes give Murtagh's safe diagnostic strategy with the Indian layer; teal boxes say when to refer; green boxes are exam pearls. A lists the parts, B this volume question by question, C the high-yield list (asked 3× or more).

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PART 17

General Medicine – Gastroenterology & Hepatology

91. Dysphagia – causes, red flags, approach

ASKED 1* · 10-mark answer

Asked in: Dec 2025 · Paper II · Q8 (10 marks)

Q (Dec 2025 · Paper II · Q8): A 55-year-old lady presents with difficulty in swallowing for the last few weeks. a) What are the causes of dysphagia? [2] b) What are the red flag pointers in dysphagia? [2] c) How will you approach this person with complaints of dysphagia? [6]

SOURCE MUR — Ch. 37 Dysphagia — pp. 458–462

Causes of dysphagia

TABLE 37.1 Causes of dysphagia.

Functional	Examples: muscle tension, 'express swallowing'
Neurological	Examples: stroke, myasthenia, MND
Mechanical	
• luminal	• Example: foreign body
• mural	• Example: stricture, tumour
• extramural	• Example: extrinsic compression (i.e. goitre)

TABLE 37.1 — reproduced from Murtagh's General Practice 9e, p. 458.

- **Definition:** difficulty in swallowing, usually with a sensation of hold-up of the bolus and sometimes pain.
- Origin is either **oropharyngeal** or **oesophageal**.
 - Oropharyngeal: usually neuromuscular, commonly **stroke**.
 - Oesophageal: motor disorders (achalasia, diffuse spasm) and peptic strictures secondary to reflux.
- Globus sensation (a constant "lump in the throat" with no real difficulty swallowing) is not dysphagia.

Table 1: Causes of dysphagia (MUR Table 37.1)

Group	Examples
Functional	Muscle tension, "express swallowing"
Neurological	Stroke, myasthenia, motor neurone disease
Mechanical, luminal	Foreign body
Mechanical, mural	Stricture, tumour
Mechanical, extramural	Extrinsic compression, e.g. goitre

- The "big three" referred for specialist investigation are **benign peptic stricture, cancer and achalasia**.

Red flag pointers in dysphagia

- Age >50 years
- Recent or sudden onset
- Unexplained weight loss

- Painful swallowing
- **Progressive dysphagia**
- Dysphagia for solids
- Hiccoughs
- Hoarseness
- Neurological symptoms or signs
- This patient is 55 years old and has had symptoms for weeks, so she already has an age red flag. Progressive dysphagia is urgent.

Approach to a patient with dysphagia

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: functional (express swallowing, psychogenic), tablet-induced irritation, pharyngotonsillitis, GORD/reflux oesophagitis
- Serious disorders not to be missed: cancer of the pharynx, oesophagus or stomach; extrinsic tumour; AIDS with opportunistic oesophageal infection; benign peptic stricture; food bolus obstruction; scleroderma; neurological causes (pseudobulbar palsy, MS/myasthenia, MND, Parkinson disease)
- Pitfalls: foreign body, drugs (phenothiazines, bisphosphonates), subacute thyroiditis, extrinsic lesions (nodes, goitre), upper oesophageal web (Plummer–Vinson), spasm, eosinophilic oesophagitis, radiotherapy, achalasia
- Masquerades: depression, drugs, thyroid disorder
- Is the patient trying to tell me something?: yes. It could be functional or globus sensation. Dysphagia is a common psychogenic symptom but must always be investigated.
- Indian layer: dysphagia is an alarm symptom, so do not give an empirical PPI trial. Investigate first.
- Indian layer: in an immunocompromised patient, look for opportunistic oesophageal infection, including candidiasis.

History

- **Level of hold-up:** the patient feels obstruction at a definite level.
 - Oropharyngeal: difficulty initiating the swallow, food sticking at the suprasternal notch, regurgitation, aspiration.
 - Oesophageal: food sticks at mid to lower sternal level.
- **Solids only** suggests a structural lesion (stricture, tumour).
- **Liquids and solids**, intermittent, suggests a motility disorder such as achalasia.
- **Short, rapidly progressive history with marked weight loss** suggests malignant obstruction.
- Reflux history: long reflux suggests peptic stricture, and GORD tends to exclude achalasia.
- Drug history, including doxycycline, iron, bisphosphonates and NSAIDs, and psychosocial factors.
- Cough or choking on liquids suggests a neurological cause.

Examination

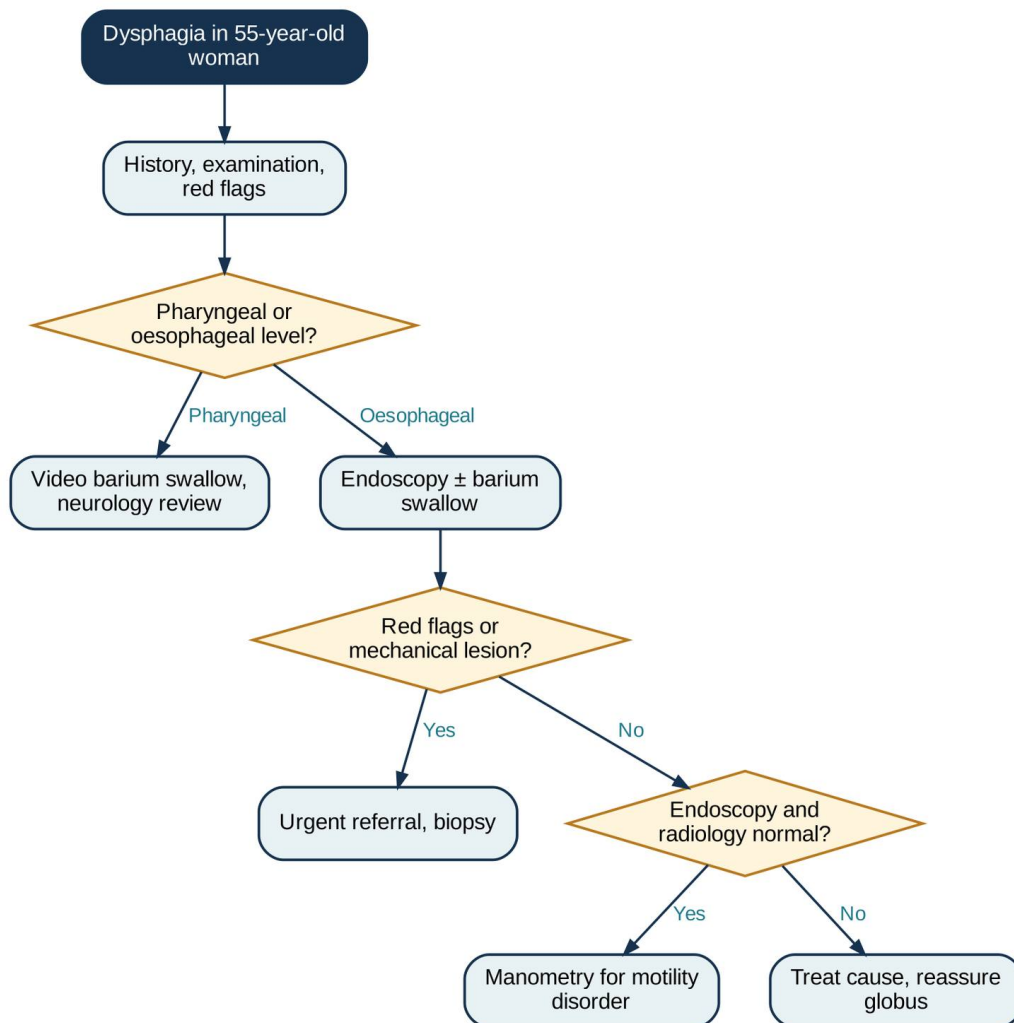
- General examination, including hands and skin for scleroderma.
- Nutritional status and BMI.
- Mouth, pharynx, larynx (look for paralysis) and dentition.
- Neck, especially lymph nodes and thyroid.
- Neurological: cranial nerves, muscle weakness, signs of stroke.
- Hard left supraclavicular node (Troisier sign) suggests gastric cancer.
- Oesophageal obstruction test: the patient swallows water while you auscultate over the left upper quadrant. Normal time to the bolus murmur is 7–10 seconds.
- Aspiration risk: a sip of water.

Investigations

- Full blood examination for anaemia.

- **Endoscopy** is generally the first investigation for suspected oesophageal dysphagia.
- **Video barium swallow** is the primary investigation for suspected pharyngeal dysphagia.
- Barium swallow should precede endoscopy if an oesophageal ring is suspected.
- Extrinsic compression: barium swallow, CT, chest X-ray.
- Manometry if endoscopy and radiology are negative. It is the only certain way to diagnose achalasia.
- PET scan helps identify oesophageal cancer.
- Do not do a barium swallow solely to diagnose GERD.

Flowchart I: Approach to dysphagia in general practice



Initial management

MANAGEMENT BASIS

India: no specific GOI/ICMR document located for dysphagia · International: ACG — GERD guideline, Am J Gastroenterol — 2022 (alarm-symptom rule) · Book: MUR 9e, ch. 37

- Treat the cause.
 - Benign peptic stricture: dilate it and treat reflux vigorously.
 - Oesophageal cancer: treatment is usually palliative surgery.
 - Achalasia: pneumatic dilatation or surgical myotomy. In the elderly, nifedipine or endoscopic botulinum toxin. Prokinetics have no place.
 - Drug-induced injury: stop the drug or take it upright with a glass of water.
 - Oesophageal candidiasis: nystatin 100 000 units/mL, 1 mL orally 6-hourly for 10–14 days. If the response is poor, fluconazole.

- Globus: education, reassuring support and time. No drug is of proven value.
- Food bolus: if water or 25–50 mL of a carbonated drink fails, urgent endoscopy.
- Consider dysphagia diets, nasogastric feeding or gastrostomy for nutrition.

REFER WHEN

- Progressive or prolonged dysphagia needs urgent attention.
- Any red flag, or a mechanical cause, which is cancer until proved otherwise.
- Progressive dysphagia with weight loss in an elderly patient.
- Food bolus impaction not relieved by water or a carbonated drink.
- Suspected achalasia or motility disorder, for manometry.

PEARLS

- Dysphagia for **solids only** means structural lesion. For **solids and liquids** it means motility disorder (achalasia).
- The "big three" are peptic stricture, cancer and achalasia.
- Fatigue, progressive dysphagia and weight loss mean oesophageal cancer until proved otherwise.
- **Endoscopy** is first for oesophageal dysphagia. **Video barium swallow** is first for pharyngeal dysphagia.
- Manometry is the only certain way to diagnose achalasia.
- Dysphagia is an alarm symptom. Do not treat empirically with a PPI.

Web sources: [W1] ACG — Clinical Guideline for the Diagnosis and Management of GERD — Am J Gastroenterol 2022;117(1):27–56 — <https://pmc.ncbi.nlm.nih.gov/articles/PMC8754510/>

92. Cholera with shock – approach, diagnosis, treating patient & family, informing authorities

ASKED 1* · 10-mark answer

Asked in: Dec 2025 · Paper II · Q6 (10 marks)

Q (Dec 2025 · Paper II · Q6): A 25-year-old gentleman has developed multiple episodes of loose stools for one day. He is brought to the casualty department and is found to be in shock. His brother was diagnosed with cholera and was admitted to the hospital 1 day ago. a) How will you approach this person who is in shock? [4] b) How will you diagnose cholera? [2] c) How will you treat the patient and the family members? [2] d) How and why would you inform the public health authorities? [2]

SOURCE MUR — Diarrhoea (ch. 34) — pp. 419, 424 · HAR — Ch. 138 Acute Infectious Diarrheal Diseases and Bacterial Food Poisoning — pp. 1078, 1080–1081

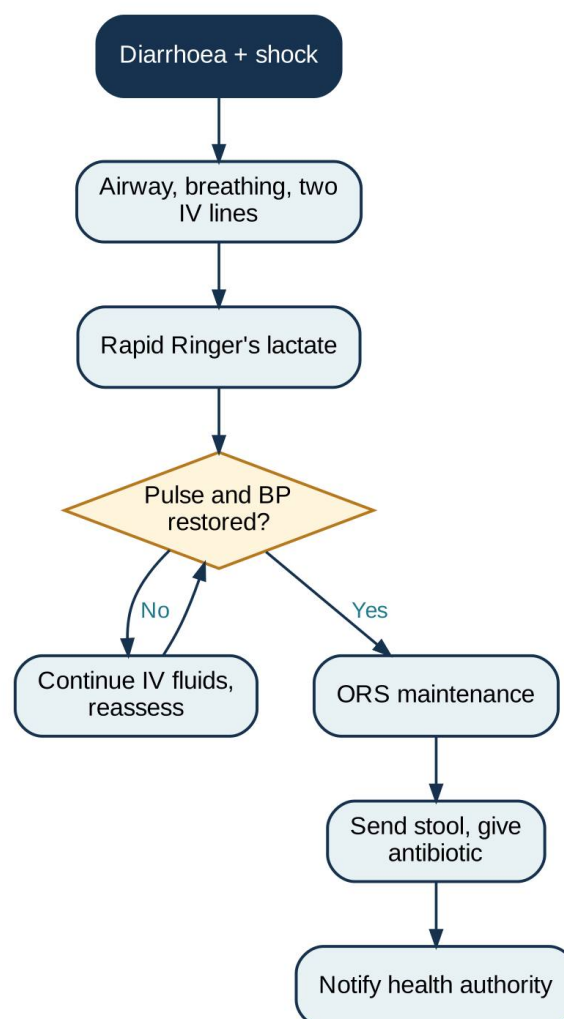
Approach to the person in shock

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: **acute infective gastroenteritis** (viral or bacterial) is the commonest cause of acute diarrhoea. Shock here means fluid loss with severe dehydration. Signs are lethargy, feeble pulse, hypotension and shock.
- Serious disorders not to be missed: **cholera**, typhoid/paratyphoid, amoebiasis, malaria, enterohaemorrhagic E. coli, intussusception, pelvic appendicitis or abscess, and HIV.
- Pitfalls: coeliac disease, and faecal impaction with overflow diarrhoea.
- Masquerades: diabetes, drugs (e.g. metformin), hyperthyroidism.
- Is the patient trying to tell me something?: anxiety or irritable bowel can cause diarrhoea. Consider laxative abuse. Neither explains shock.
- Indian layer: an epidemiological link (brother with cholera) plus rice-water stools makes cholera the working diagnosis. Fever with diarrhoea may also be malaria. About 75% of infected people are asymptomatic but shed vibrios for 7–14 days.
- Treat as an emergency and resuscitate first, because severe dehydration or shock is a medical emergency.
 - Fluid replacement is the mainstay of cholera care.
 - Do not wait for investigations. Treatment does not depend on laboratory results.

- Start IV access (two lines if needed) and give IV fluids immediately.
 - Use Ringer's lactate. Normal saline is the alternative if it is unavailable.
 - Give ORS by mouth as well once the patient can drink safely.
- Look for red flags: blood in stool, fever, severe abdominal pain, weight loss, overseas travel.
- History pointers:
 - Stool type and frequency. Frequent stools are the first warning of dehydration.
 - Vomiting, abdominal pain, antibiotic use, and whether anyone else is sick (common source).
 - Immunosuppression or HIV risk.
- Examination: grade dehydration.
 - Moderate: orthostatic fall in BP, skin tenting, sunken eyes.
 - Severe: lethargy, feeble pulse, hypotension, shock.
- First-line tests: stool for microscopy and culture, plus electrolytes. Complications to anticipate are hypokalaemia and vascular collapse.

Flowchart 1: Cholera with shock in the casualty



How will you diagnose cholera?

- Clinical: acute profuse **rice-water** stools suggest cholera or a similar toxigenic process. The stool looks like water after rice has been cooked.
- Case definition (India): in an endemic area, acute watery diarrhoea with or without vomiting in a patient aged **5 years or more**. In an epidemic area, the same illness in any patient.
- Laboratory confirmation: isolate **Vibrio cholerae O1 or O139** from stool.
 - Culture on selective media, **TCBS** or **TTG agar**. Rapid diagnostic tests are also available.

- Test specimens from the first few suspected cases only. Once cholera is confirmed, do not examine specimens from all cases or contacts.

Treatment of the patient and family members

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflows (Gastroenterology; Acute Diarrhoea) — no year given;
MoHFW/NCDC IDSP laboratory manual — no year given · International: WHO AFRO — Cholera Management Guidelines — 2025 revision

Patient

- Rehydration is the priority. ORS cut cholera mortality from >50% (untreated) to <1%.
- Severe dehydration or shock: IV Ringer's lactate plus ORS when the patient can drink safely.
 - WHO Plan C gives **100 mL/kg** Ringer's lactate (normal saline if unavailable). The first **30 mL/kg** goes in rapidly, then **70 mL/kg**.
 - Reassess frequently. Too much IV fluid can cause pulmonary oedema, and too little can cause renal failure.
- After the shock is corrected, give ORS as maintenance and restart feeding as soon as the patient tolerates it.
 - Reduced-osmolarity WHO ORS per litre: NaCl 2.6 g, trisodium citrate 2.9 g, KCl 1.5 g, glucose 13.5 g.
- Antibiotic (adjunct, does not replace fluids):
 - First line: **doxycycline 300 mg** single dose in adults.
 - Alternatives: **azithromycin 1 g** or ciprofloxacin 1 g, single dose.
 - Use antimicrobial susceptibility testing where available.
 - Zinc is also complementary.

Family members

- Brief the family on ORS early for any loose stool and on when to come back (dehydration, vomiting, no urine).
- Remember that infected people may be asymptomatic yet shed vibrios for 7–14 days.
- Hygiene: safe water and improved sanitation limit faecal–oral spread.
- Hand-washing and safe food handling at home. Screen household contacts clinically. Laboratory testing of all contacts is not needed.

How and why would you inform the public health authorities?

- **How:**
 - Notify a suspect case **immediately** to the local health office, by messenger, telephone or fax.
 - State health authorities then notify confirmed cases **weekly** to the DGHS (Central Bureau of Health Intelligence).
 - WHO AFRO says to notify the next level within 24 hours.
- **Why:**
 - Cholera is epidemic-prone, and a case with a brother also affected suggests a common source.
 - Notification triggers outbreak investigation of the water or food source and contact tracing.
 - Early rehydration keeps the case-fatality rate below 1%.
 - Laboratory confirmation of the first cases supports the declaration of an outbreak.

PEARLS

- Cholera: rice-water stool, shock from fluid loss. Fluids first, then antibiotic.
- Fluid of choice: Ringer's lactate, 100 mL/kg in WHO Plan C (30 mL/kg, then 70 mL/kg).
- Drug of choice in adults: doxycycline 300 mg single dose; alternative azithromycin 1 g.
- Confirmation: culture of *V. cholerae* O1/O139 on TCBS/TTG. Treat before results.
- Notify a suspect case immediately. Do not wait for culture.
- Trap: about 75% of infections are asymptomatic, so contacts can still shed vibrios.

Web sources: [W1] MoHFW/NCDC IDSP — Manual for Laboratory Diagnosis, cholera chapter (case definition, notification) — no version year given — https://idsp.mohfw.gov.in/WriteReadData/OldSite/Lab_Manual.pdf · [W2] WHO AFRO — Cholera Management Guidelines (2025 revision) — 2025 — [https://www.afro.who.int/sites/default/files/2025-03/Cholera%20Management%20Guidelines%20Revision%20\(2\).pdf](https://www.afro.who.int/sites/default/files/2025-03/Cholera%20Management%20Guidelines%20Revision%20(2).pdf) · [W3] WHO — Diarrhoea Treatment Guidelines including new recommendations (Plan C) — <https://cdn.who.int/media/docs/default-source/2021-dha-docs/pnadk428.pdf>

93. Hepatitis B (HBsAg-positive couple in pregnancy) – markers, course, management

ASKED 1× · 10-mark answer

Asked in: Oct 2023 · Paper II · Q3 (10 marks)

Q (Oct 2023 · Paper II · Q3): A 28-year-old female came for antenatal checkup, she was found to be Hbs Ag positive. Her husband was also checked and found to be HBsAg positive: a) Who are the groups of people at increased risk for transmission? [2] b) Which are the acute phase and chronic phase serological markers? [2] c) What will be the course of disease? [2] d) Write briefly on management of chronic Hepatitis B. [2] e) If her husband was tested negative, what advice you would have given? [2]

SOURCE HAR — Ch. 350 Acute Viral Hepatitis — pp. 2645, 2656, 2659, 2664

1. Groups at increased risk of transmission

- **Neonates born to HBsAg-positive mothers** (perinatal transmission). Neonates are especially likely to remain chronically infected after acute infection.
- **Sexual contacts** of an infected person, which includes the husband in this couple. HAR gives post-exposure prophylaxis for persons exposed by sexual contact.
- **Percutaneous or mucosal exposure** to HBsAg-positive blood or body fluids, such as needle-stick injury.
- **Haemodialysis patients**, who need annual anti-HBs testing after vaccination.
- **Healthcare workers and other high-risk groups**, to whom the NVHCP extends hepatitis B vaccine.
- Persons with Down syndrome and chronically ill persons are more likely to stay chronically infected after acute HBV.

2. Serological markers

Table 1: Serological markers of HBV infection

Phase	Markers	Note
Acute	HBsAg, IgM anti-HBc	HBsAg is the first marker, appearing at 1–12 weeks. It is found in >95% of acute cases.
Acute (recovery)	Anti-HBs	Appears after HBsAg clears. It is the protective antibody.
Chronic	HBsAg, IgG anti-HBc	HBsAg persisting beyond 6 months defines chronicity.
Replication and infectivity	HBeAg, HBV DNA	These correlate with infectivity.
Inactive state	Anti-HBe	Anti-HBe is the antibody to HBeAg.

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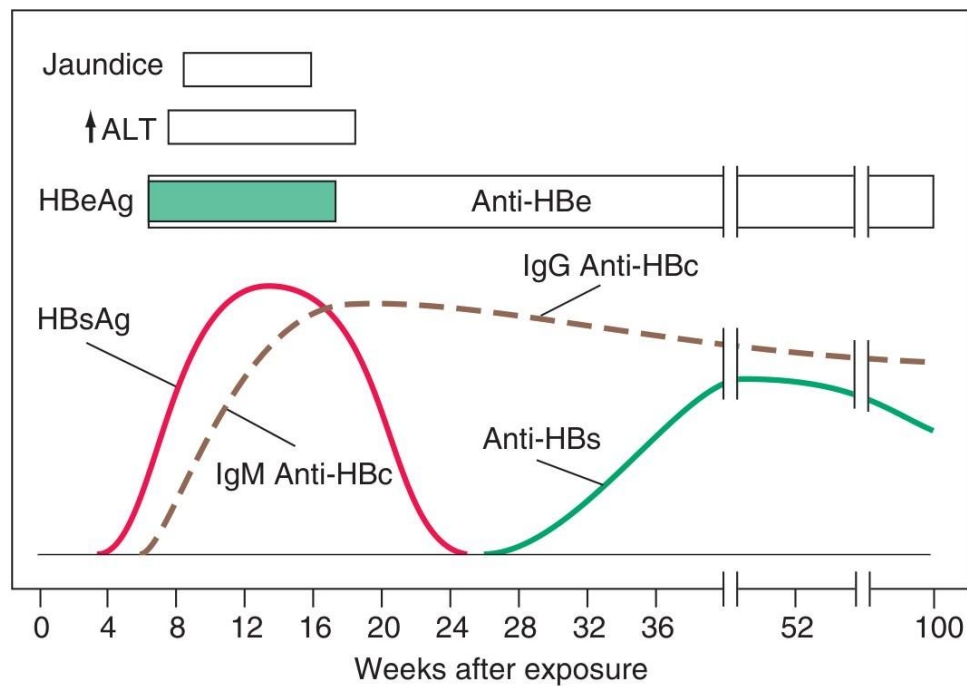


FIGURE 350-4 Scheme of typical clinical and laboratory features of acute hepatitis B.

FIGURE 350-4 — reproduced from Harrison's 22e, p. 2645.

- HBcAg is not tested because naked core particles do not circulate.
- In chronic hepatitis B, HBeAg and anti-HBe assess relative infectivity. HBV DNA is a quantitative measure of replication and guides antiviral therapy.
- In India, positive screening results must be confirmed by molecular testing (viral load).

3. Course of disease

- **Acute infection in healthy adults:** it is self-limited in 95–99%, with recovery in 3–4 months from the onset of jaundice in three-quarters of uncomplicated cases.
- HBsAg usually clears 1–2 months after jaundice and rarely persists beyond 6 months.
- Case-fatality is about 0.1%. It is about 1% in patients ill enough to be hospitalised.
- **Fulminant hepatitis** is rare. Hepatitis B accounts for more than 50% of fulminant viral hepatitis cases.
- **Chronicity:** the rate after clinically apparent acute hepatitis B is as low as 1% in immunocompetent young adults, and earlier estimates were up to 10%. It is highest in neonates.
- Chronic infection has three outcomes.
 - Inactive carrier.
 - Mild chronic hepatitis.
 - Moderate to severe chronic hepatitis, with or without cirrhosis.
- HBV-related **hepatocellular carcinoma** is promoted by HBxAg.
- **Exacerbations** and reactivation may occur, for example after immunosuppression or rituximab.
- **HDV superinfection** in chronic HBV often leads to clinical deterioration.

4. Management of chronic hepatitis B

MANAGEMENT BASIS

India: MoHFW — NVHCP Hepatitis B Technical Guidelines — 2019 · International: WHO — Guidelines for chronic hepatitis B — 2024

- **Evaluate:** HBsAg, HBeAg/anti-HBe and HBV DNA. Serial testing is often needed to separate the inactive carrier from HBeAg-negative chronic hepatitis B.

- **Treatment criteria (WHO 2024):**
 - Treat significant fibrosis ($\geq F2$: APRI >0.5 or transient elastography >7 kPa).
 - Treat cirrhosis (APRI >1.0 or elastography >12.5 kPa).
 - In both, treat regardless of HBV DNA or ALT.
- WHO 2024 criteria are newer than the 2019 NVHCP guideline. Use the NVHCP protocol for Indian answers and cite WHO as the newer international position.
- **Pregnancy (this patient):** the antenatal woman is labelled a "High-Risk Pregnancy" and referred to the nearest NVHCP treatment centre.
- If HBV DNA and HBeAg testing are not available, WHO advises tenofovir disoproxil fumarate prophylaxis for all HBsAg-positive pregnant women. It should preferably start from the second trimester and continue until at least delivery or completion of the infant vaccine series.
- High HBV DNA ($>2 \times 10^5$ IU/mL): tenofovir in the third trimester further reduces perinatal transmission.
- **Newborn:** give hepatitis B vaccine in the left thigh and HBIG 100 IU in the right thigh, both IM, in the labour room.
- **Follow-up:** monitor for cirrhosis and hepatocellular carcinoma. Avoid or cover immunosuppression, because of the reactivation risk.

5. Advice if the husband is HBsAg-negative

- **Vaccinate him** with a complete course of hepatitis B vaccine, since he is a susceptible sexual contact.
- **Check anti-HBs after the course** to document immunity. If he does not respond, repeat vaccination with a more immunogenic preparation may be needed.
- Booster doses are not routinely needed in immunocompetent adults, because protection persists through the anamnestic response.
- If hepatitis A protection is also wanted, a combined hepatitis A and B vaccine is given at 0, 1 and 6 months.
- **Baby:** explain that vaccine plus HBIG at birth prevents transmission.
- Counsel the couple that the wife needs follow-up at an NVHCP treatment centre.

PEARLS

- Acute HBV: HBsAg and IgM anti-HBc. Chronic HBV: HBsAg for more than 6 months with IgG anti-HBc.
- HBeAg and HBV DNA indicate replication and infectivity. Anti-HBs is the protective antibody.
- Adults recover in 95–99% of cases. Neonates are the group most likely to become chronic.
- Newborn of an HBsAg-positive mother: vaccine (left thigh) and HBIG 100 IU (right thigh), both IM, in the labour room.
- Trap: a negative spouse is vaccinated, then anti-HBs is checked to confirm immunity.

Web sources: [W1] MoHFW NVHCP — National Guidelines / Hepatitis B Technical Guidelines — 2019 — <https://nvhcp.mohfw.gov.in/Guidelines> · [W2] WHO — Guidelines for the prevention, diagnosis, care and treatment for people with chronic hepatitis B infection — 2024 — <https://www.who.int/publications/i/item/9789240090903>

PART 18

General Medicine – Endocrinology, Diabetes & Metabolism

94. Midline neck swelling moving with deglutition ± thyrotoxicosis – DDx, investigations (TI-RADS), treatment

ASKED 3★ · 10-mark answer

Asked in: Jun 2020 · Paper II · Q1 (10 marks) · Oct 2024 · Paper II · Q4 (10 marks) · Jun 2025 · Paper II · Q10 (10 marks)

Q (Jun 2020 · Paper II · Q1): A 28-year-old female presents with diffuse swelling in the mid line of neck which moves with deglutition. She also has bilateral prominent eyes. a) Discuss the differential diagnosis in such case. [3] b) What investigations will you do and what do you expect in her? [3] c) What are all the various treatment options available to her? [4]

Q (Oct 2024 · Paper II · Q4): An 18-year-old girl has come with swelling in front of the neck for the past three months. a) List the differential diagnosis. How will you differentiate thyroid swelling from other swellings? [3] b) Mention any four features of thyrotoxicosis you will look for in this patient. [2] c) What are the initial investigations and management in family practice? [4] d) List any two indications for surgical treatment? [1]

Q (Jun 2025 · Paper II · Q10): A 17-year-old girl presented to you with a swelling in front of her neck, which moves with deglutition. On examination, her pulse rate is 130 per minute and she has fine tremors. a) What relevant history will you elicit and what will you look for in the examination? [3] b) Describe the thyroid Image reporting and data scoring system. [3] c) Describe the management of this 17-year-old girl. [4]

SOURCE MUR — Ch. 14 Endocrine and metabolic disorders: thyroid — pp. 136–139, 146 · BL — Ch. 55 The thyroid gland — pp. 852–853, 855–859, 861–862

1. Differential diagnosis of a midline neck swelling that moves on swallowing, with bilateral prominent eyes

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: **Graves' disease**. This is a diffuse vascular goitre with eye signs, typically in a younger woman. Exophthalmos with goitre is the classic picture of thyrotoxicosis.
- Serious disorders not to be missed:
 - Thyroid crisis.
 - Atrial fibrillation and heart failure.
 - Thyroid carcinoma if any discrete hard nodule, rapid growth, hoarseness or nodes are present.
- Pitfalls:
 - Hashimoto thyroiditis can have an early thyrotoxic phase.
 - Do not start treatment before the cause is established.
- Masquerades: anxiety or psychosis, proximal myopathy and periodic paralysis, menstrual disturbance.
- Is the patient trying to tell me something?: anxiety, irritability and weight loss may be the presenting complaint rather than the neck swelling.
- Indian layer:
 - Graves' disease is the commonest cause in iodine-sufficient regions, followed by toxic multinodular goitre, toxic adenoma and thyroiditis.
 - Endemic iodine-deficiency goitre occurs in the Himalayas.
 - Chronic tuberculous thyroiditis is a rare inflammatory cause.

Table 1: Differential diagnosis (goitre with eye signs)

Diagnosis	Pointers
Graves' disease	Diffuse vascular goitre, eye signs, uniform increased isotope uptake
Toxic multinodular goitre	Older patient, long-standing nodular goitre, rarely eye signs, irregular uptake
Hashimoto thyroiditis	Firm, rubbery bilateral goitre, TPO Ab positive; may be hypothyroid or euthyroid
Subacute (de Quervain) thyroiditis	Thyrotoxic with poor or no isotope uptake
Simple (euthyroid) goitre	Diffuse and soft, pubertal or endemic; no toxicity
Neoplasm (benign or malignant)	Discrete hard nodule; a discrete swelling in a teenager is provisionally carcinoma

2. Investigations and expected findings

- **TSH** (T3 and T4 if abnormal) and thyroid autoantibodies are the essential tests.
- Expected thyroid function: TSH undetectable, free T4 and T3 high. The Indian consensus defines overt hyperthyroidism as low TSH with raised total T3 and/or FT4.
- **TSH-receptor antibody** is often present in Graves' disease. **Anti-TPO** is often positive.
- **Ultrasonography** (with Doppler) assesses gland texture, nodules and regional nodes.
- **Isotope scan** shows uniform increased uptake in Graves' disease. Irregular uptake suggests toxic multinodular goitre. Uptake is poor or absent in de Quervain thyroiditis.
- **FNAC** is for any discrete swelling.
- **ECG** looks for tachycardia or atrial fibrillation.

3. Treatment options

MANAGEMENT BASIS

India: Indian Thyroid Society — Management of hyperthyroidism in adults in India: consensus statement — 2026 ·
International: Bailey & Love 28e ch. 55; Murtagh 9e ch. 14

- The four options are symptomatic therapy, antithyroid drugs, radioactive iodine and surgery.

Table 2: Options in diffuse toxic goitre

Option	Details	Limits
Symptomatic	Propranolol 10–40 mg 6–8 hourly	Acts on target organs, not the gland
Antithyroid drugs	Carbimazole (10–45 mg daily, starting 10–20 mg) or propylthiouracil 200–600 mg daily. Treat 6 months (mild) to 2 years (severe)	Failure rate at least 55%
Radioiodine	Reduces functioning thyroid mass	Needs isotope facility, avoid pregnancy and contact with children, eye signs may worsen
Surgery	Subtotal or total thyroidectomy	Recurrence in ≥5% after subtotal; hypoparathyroidism and nerve injury

- Most patients get an initial antithyroid course, with radioiodine for relapse.

4. Differentiating thyroid swelling from other swellings, and differential diagnosis

- Differential diagnosis: simple goitre, toxic goitre (Graves', toxic nodular, toxic adenoma), neoplasm (benign or malignant), and inflammatory (Hashimoto, de Quervain, Riedel, infective).
- In an 18-year-old, a diffuse soft pubertal goitre is common. A discrete swelling in a teenager must be provisionally treated as carcinoma.

TABLE 55.3 Classification of thyroid swellings.

Simple goitre (euthyroid)	Diffuse hyperplastic	• Physiological • Pubertal • Pregnancy
	Multinodular goitre	
Toxic	Diffuse (Graves' disease)	
	Multinodular	
	Toxic adenoma	
Neoplastic	Benign	
	Malignant	
Inflammatory	Autoimmune	Chronic lymphocytic thyroiditis
		Hashimoto's disease
	Granulomatous	de Quervain's thyroiditis
	Fibrosing	Riedel's thyroiditis
	Infective	Acute (bacterial thyroiditis, viral thyroiditis, 'subacute thyroiditis')
		Chronic (tuberculous, syphilitic)
	Other	Amyloid

TABLE 55.3 — reproduced from Bailey & Love 28e, p. 855.

- The normal thyroid is impalpable. A goitre is a generalised enlargement. A **solitary** nodule is a discrete swelling in an otherwise impalpable gland; a **dominant** nodule lies in a gland that is abnormal elsewhere.
- A thyroid swelling is usually smooth and painless, and **moves freely on swallowing**.
- Ultrasonography confirms the organ of origin and characterises the lesion. FNAC is the investigation of choice for a discrete swelling.

5. Four features of thyrotoxicosis to look for

- **Agitated, restless** patient with **warm, sweaty hands**.
- **Fine tremor** (paper on the hands).
- **Tachycardia** or bounding pulse, with possible atrial fibrillation.

- **Eye signs:** lid retraction, lid lag, exophthalmos.
- Also proximal myopathy and hyperactive reflexes.

6. Initial investigations and management in family practice

MANAGEMENT BASIS

India: Indian Thyroid Society — Management of hyperthyroidism in adults in India — 2026 · International: Murtagh 9e ch. 14; Bailey & Love 28e ch. 55

- First-line tests are TSH, with T3 and T4 if abnormal, and thyroid autoantibodies. Add ultrasonography and FNAC if a nodule is felt.
- Establish the precise cause before treatment.
- Relieve symptoms with propranolol 10–40 mg 6–8 hourly.
- Refer to an endocrinologist to guide definitive treatment.
- Educate about possible recurrent hyperthyroidism or later hypothyroidism, and the need for lifelong monitoring.
- Monitor for cardiovascular complications, osteoporosis and eye problems.

REFER WHEN

- Overt thyrotoxicosis needing specific therapy.
- Progressive eye signs or a large goitre.
- Pregnancy.
- Discrete hard nodule, hoarseness, cervical nodes, or rapid growth.
- Tracheal or swallowing symptoms.

7. Two indications for surgery

- **Suspicion of malignancy** or neoplasia, including follicular neoplasm on FNAC.
- **Pressure symptoms** (tracheal compression) or a large goitre. Surgery is also used for toxic goitres with large size or failed drug treatment.

8. Relevant history and examination

- History:
 - Duration and growth, pain, sudden enlargement.
 - Hoarseness, dysphagia, breathlessness.
 - Anxiety, weight loss, weakness, sweating, palpitations, menstrual change.
 - Family history of autoimmune endocrine disease (present in 55% of Graves' patients).
 - Residence in an iodine-deficient area, goitrogens and drugs.
- Examination:
 - Pulse rate and rhythm, tremor, warm moist hands, hyperactive reflexes, proximal myopathy.
 - Eyes: lid retraction, lid lag, exophthalmos, ophthalmoplegia.
 - Neck: diffuse or nodular, smooth or hard, movement on swallowing. Also cervical nodes and retrosternal extension (tracheal displacement).

9. Thyroid Imaging Reporting and Data System (ACR TI-RADS)

- ACR TI-RADS (2017) is a standardised ultrasound reporting system for thyroid nodules.
- Five features are scored: composition, echogenicity, shape, margin and echogenic foci.
- The points are summed to give a category.
- The category plus the maximum nodule size decides FNA or follow-up.

Table 3: ACR TI-RADS categories and action

Points	Category	FNA if nodule size
0	TR1 benign	No FNA
2	TR2 not suspicious	No FNA
3	TR3 mildly suspicious	≥2.5 cm
4–6	TR4 moderately suspicious	≥1.5 cm
≥7	TR5 highly suspicious	≥1.0 cm

- Follow-up scans: TR3 at 1, 3 and 5 years; TR4 at 1, 2, 3 and 5 years; TR5 annually for 5 years.
- The ultrasound features that predict malignancy include microcalcification and increased vascularity.

10. Management of this 17-year-old girl (tachycardia 130/min, tremor, goitre)

MANAGEMENT BASIS

India: Indian Thyroid Society — Management of hyperthyroidism in adults in India — 2026 · International: Bailey & Love 28e ch. 55; Murtagh 9e ch. 14

- Confirm biochemically and establish the cause (TSH, T3/T4, TRAb, ultrasonography) before treatment.
- Start **propranolol** for rapid symptom control (10–40 mg 6–8 hourly).
- Specialist-guided **thionamide**: carbimazole 10–45 mg daily, starting 10–20 mg in divided doses.
- Continue for 6 months to 2 years, aiming at remission.
- Relapse or failure leads to radioiodine or surgery.
- Surgery is favoured if the goitre is large or eye signs are progressing.
- Counsel that:
 - Recurrence is possible and monitoring is lifelong.
 - Pregnancy must be avoided after radioiodine.
 - Propylthiouracil is first-line in the first trimester.

PEARLS

- Graves' disease: diffuse vascular goitre, exophthalmos, TSH suppressed with high T3/T4, and uniform uptake on isotope scan.
- FNAC is the investigation of choice for a discrete swelling.
- A discrete swelling in a teenager is provisionally carcinoma.
- Antithyroid drugs: failure rate is at least 55%.
- TI-RADS: TR3 ≥2.5 cm, TR4 ≥1.5 cm, TR5 ≥1.0 cm for FNA.

Web sources: [W1] Indian Thyroid Society — Management of hyperthyroidism in adults in India: consensus statement, Thyroid Research and Practice — 2026 — https://journals.lww.com/trap/fulltext/2026/01000/management_of_hyperthyroidism_in_adults_in_india_.1.aspx · [W2] Size of a thyroid nodule with ACR TI-RADS (ACR White Paper 2017 table), PMC — <https://pmc.ncbi.nlm.nih.gov/articles/PMC10298589/> · [W3] Thyroid Imaging Reporting and Data System in the diagnostic performance of thyroid nodules, PMC — <https://pmc.ncbi.nlm.nih.gov/articles/PMC11548367/> · [W4] Investigating thyroid nodules, PMC — <https://pmc.ncbi.nlm.nih.gov/articles/PMC8671014/>

95. Functions of thyroid hormones; features of hyper- & hypothyroidism

ASKED 1* · 10-mark answer

Asked in: Oct 2023 · Paper II · Q8 (10 marks)

Q (Oct 2023 · Paper II · Q8): A 65-year-old man presents with history of tiredness, frequent stools and decreased sleep for the past 3 months. She is a known diabetic on Metformin 1gm BD. She also reports to have a recent loss weight of 3 Kgs. On examination, extremities are warm to touch, pulse- 110/min, BP- 140/70mmHg, cardiac auscultation S1S2 present and a soft systolic murmur over apex and aortic area, chest is clear. a) What are the functions of thyroid hormones in a normal human? [2] b) What are the common symptoms and signs of hyperthyroidism? [3] c) What are the common symptoms and signs of hypothyroidism? [3] d) What complications do you expect in her if she is left untreated? [2]

SOURCE HAR — Ch. 390 Physiology of Anterior Pituitary Hormones — p. 2991 · HAR — Ch. 395 Hypothyroidism — p. 3028 · HAR — Ch. 396 Hyperthyroidism and Other Causes of Thyrotoxicosis — pp. 3033–3034

1. Functions of thyroid hormones (T4, T3) in a normal human

- T3 and T4 act on almost all body cells to **raise the basal metabolic rate**. They increase oxygen consumption and thermogenesis.
- **Growth and development:** they control growth and are essential for brain and CNS development and bone maturation.
- **Metabolism:**
 - They stimulate carbohydrate metabolism, protein synthesis and lipolysis.
 - In high doses they cause protein catabolism.
- **Cardiovascular:** they increase heart rate and contractility and enhance the sensitivity of beta-adrenergic receptors to catecholamines.
- **Nervous system:** they increase alertness and wakefulness and speed up peripheral reflexes.
- **Gut:** they increase gastrointestinal tone and motility.
- **Reproductive:** they regulate the ovulatory cycle and spermatogenesis.
- **Regulation:** TSH from the pituitary stimulates synthesis and release of thyroid hormones. TRH stimulates TSH, and thyroid hormones are the predominant negative regulator of TSH.

2. Symptoms and signs of hyperthyroidism (thyrotoxicosis)

Table 1: Thyrotoxicosis features, in descending order of frequency

Symptoms	Signs
Hyperactivity, irritability, dysphoria	Tachycardia; atrial fibrillation in the elderly
Heat intolerance, sweating	Tremor
Palpitations	Goitre
Fatigue, weakness	Warm, moist skin
Weight loss with increased appetite	Proximal myopathy
Diarrhoea, polyuria	Lid retraction or lag
Oligomenorrhoea, loss of libido	Gynaecomastia

- **Cardiovascular:**
 - Sinus tachycardia is the commonest finding.
 - High cardiac output gives a bounding pulse, widened pulse pressure and an aortic systolic murmur.
- **Neuromuscular:** fine tremor, hyperreflexia and proximal myopathy.
- **Other features:**
 - Diffuse alopecia occurs in up to 40%.
 - Stool frequency is increased.
- **Elderly:**
 - Features may be subtle (apathetic thyrotoxicosis), with mainly fatigue and weight loss.

- It may be mistaken for depression.
- **Graves' disease only:**
 - The thyroid is diffusely enlarged and firm, with a possible thrill or bruit.
 - Ophthalmopathy, dermatopathy (pretibial myxoedema) and acropachy occur.
- **This patient fits:** warm extremities, pulse 110/min, frequent stools, weight loss, poor sleep, and a flow murmur from the hyperdynamic circulation.

3034

PART 12

Endocrinology and Metabolism



FIGURE 396-1 Features of Graves' disease. **A.** Ophthalmopathy in Graves' disease; lid retraction, periorbital edema, conjunctival injection, and proptosis are marked. **B.** Thyroid dermatopathy over the lateral aspects of the shins. **C.** Thyroid acropachy.

FIGURE 396-1 — reproduced from Harrison's 22e, p. 3034.

3. Symptoms and signs of hypothyroidism

Table 2: Hypothyroidism features, in descending order of frequency

Symptoms	Signs
Tiredness, weakness	Dry coarse skin; cool peripheries
Feeling cold	Puffy face, hands and feet (myxoedema)
Poor concentration and memory	Diffuse alopecia
Weight gain with poor appetite	Bradycardia
Constipation	Peripheral oedema
Dyspnoea	Delayed relaxation of tendon reflexes
Hoarse voice	Carpal tunnel syndrome
Menorrhagia (later oligomenorrhoea or amenorrhoea)	Serous cavity effusions
Paraesthesia; impaired hearing	

- Autoimmune (Hashimoto's) thyroiditis is the commonest cause, with or without goitre.
- Subclinical hypothyroidism is a compensated state in which TSH is raised but thyroid hormone levels are normal. Symptoms become evident at TSH >10 mIU/L (overt hypothyroidism).
- Congenital hypothyroidism presents with prolonged jaundice, feeding problems, hypotonia, an enlarged tongue and umbilical hernia.

4. Complications of untreated (hyper)thyroidism in this patient

- **Cardiac:**
 - Atrial fibrillation is more common over 50 years.
 - Angina or heart failure may worsen in the elderly or in those with pre-existing heart disease.
- **Bone:** osteopenia in long-standing thyrotoxicosis, mild hypercalcaemia in up to 20%, and a small rise in fracture rate.
- **Neuromuscular:** proximal myopathy, and hypokalaemic periodic paralysis, which is particularly common in Asian males.
- **Graves' eye disease (if Graves'):**
 - Proptosis, diplopia and corneal exposure damage.
 - Optic nerve compression, which can cause permanent visual loss.
- **Skin and limbs (Graves'):** dermopathy and acropachy.
- **Natural history:** features generally worsen without treatment. Mortality was 10–30% before satisfactory therapy.
- **Diabetes link:** thyrotoxicosis makes glycaemic control harder. The patient is on metformin and needs her HbA1c reviewed.

PEARLS

- Thyroid hormones raise BMR and are needed for brain and bone development. TSH is the main negative-feedback marker.
- Hyperthyroid: weight loss with a good appetite, tachycardia, warm moist skin and tremor. TSH is suppressed with raised T3/T4.
- Elderly patients may be apathetic, with AF or heart failure. This can mimic depression.
- Hypothyroid: cold intolerance, weight gain, constipation, bradycardia and delayed ankle-jerk relaxation.
- Thyroid dermopathy is almost always accompanied by ophthalmopathy. Acropachy without skin or eye disease should prompt a search for another cause of clubbing.
- Untreated thyrotoxicosis: AF, heart failure, osteopenia and eye disease.

Web sources: [W1] NCBI Bookshelf (StatPearls) — Physiology, Thyroid Hormone — <https://www.ncbi.nlm.nih.gov/sites/books/NBK500006/> · [W2] NCBI Bookshelf (Endotext) — Cellular Action of Thyroid Hormone — <https://www.ncbi.nlm.nih.gov/sites/books/NBK285568/> · [W3] NCBI Bookshelf (StatPearls) — Histology, Thyroid Gland — <https://www.ncbi.nlm.nih.gov/sites/books/NBK551659/> · [W4] NCBI Bookshelf (StatPearls) — Physiology, Thyroid Function — <https://www.ncbi.nlm.nih.gov/sites/books/NBK537039/>

PART 19

General Medicine – Infectious Diseases

96. Rational use of antibiotics in sore throat

ASKED 1* · 4–5–mark answer

Asked in: Apr 2023 · Paper II · Q5(b) (5 marks)

Q (Apr 2023 · Paper II · Q5(b)): A 14-year-old old boy presents with fever and sore throat: b) Discuss rational use of antibiotics for treating patients with sore throat. [5]

SOURCE PSM — Emerging and re-emerging infectious diseases (antimicrobial resistance) — p. 417 · PSM — Rheumatic heart disease (prevention) — p. 443

Rational antibiotic use in sore throat

Why it matters

- Misuse of antimicrobials is the most important contributor to AMR.
- Resistance follows antibiotics given for the wrong infection, in the wrong dose, for the wrong period.
- Over-the-counter availability and self-treatment with too-small doses worsen resistance.
- Most sore throats are viral. Antibiotics are stopped in viral pharyngitis, viral rhinosinusitis and viral bronchitis.

Decide: does he need an antibiotic?

- Use the **Centor score**. Its four criteria are exudative pharyngitis, tender cervical lymphadenopathy, fever, and absence of cough. Three of four predict a bacterial cause.
- Cough, coryza, hoarseness and conjunctivitis suggest a viral cause, so give symptomatic care only.
- Throat swab culture is ideal but often unavailable in India. Treating a sore throat with penicillin without culture is justified in high-risk groups such as school-age children.
- The aim is to prevent **rheumatic fever and RHD**. Penicillin eradicates streptococci from the throat.
- Centor 0–2, or a viral picture: no antibiotic. Give paracetamol, fluids and gargles, and advise return if the illness worsens.

Treatment when an antibiotic is indicated

MANAGEMENT BASIS

India: ICMR — Treatment Guidelines for Antimicrobial Use in Common Syndromes — 2019 text (2022 edition listed) ·

International: IDSA — group A streptococcal pharyngitis guideline

Table 1: Antibiotic choice in streptococcal pharyngitis

Situation	Drug and dose	Duration
First line, oral (adult)	Penicillin V 500 mg twice daily	10 days
First line, oral (child)	Penicillin V 250 mg twice daily	10 days
Single-dose or compliance concern	Benzathine penicillin IM: <27 kg 6,00,000 units; >27 kg 1.2 million units	Single dose
Penicillin allergy	Clarithromycin or azithromycin	Per ICMR schedule

- Amoxicillin is an alternative to penicillin V, for 10 days.
- First-generation cephalosporins or erythromycin are also listed for penicillin allergy.
- A 14-year-old is likely to weigh more than 27 kg, so IM benzathine penicillin would be 1.2 million units.
- Compliance is the crucial problem with oral penicillin. Counsel him to complete all 10 days.

Principles of rational use

- Avoid broad-spectrum drugs and avoid fluoroquinolones. Narrow-spectrum penicillin is sufficient for group A streptococcus.
- Avoid unnecessary antibiotic courses, over-the-counter sales and incomplete courses.
- Educate the patient and family that viral illness needs no antibiotic.
- Stewardship works within the One Health National Action Plan on AMR 2.0, 2025–2029, which aims to optimise antimicrobial use.

PEARLS

- Most sore throats are viral, so no antibiotic is needed.
- Centor: exudate, tender cervical nodes, fever, no cough. Three of four suggests bacterial cause.
- Drug of choice: penicillin V for 10 days, or single-dose IM benzathine penicillin.
- Penicillin allergy: macrolide (azithromycin or clarithromycin).
- The aim is to prevent rheumatic fever. Incomplete courses and wrong drugs fuel AMR.

Web sources: [W1] ICMR — Treatment Guidelines for Antimicrobial Use in Common Syndromes — 2019 text — https://www.icmr.gov.in/icmrobject/custom_data/pdf/resource-guidelines/Treatment_Guidelines_2019_Final.pdf · [W2] MoHFW/NCDC — National Action Plan on Antimicrobial Resistance (NAP-AMR 2.0) 2025–2029 — November 2025 — <https://www.n.cdc.mohfw.gov.in/wp-content/uploads/2025/11/National-Action-Plan-on-Antimicrobial-Resistance-NAP-AMR-2.0.pdf>

PART 20

General Medicine – Haematology & Transfusion

97. Anaemia from GI blood loss – history, causes, drugs causing anaemia

ASKED 1* · 6–7–mark answer

Asked in: Oct 2023 · Paper II · Q9(a,b,d) (6 marks)

Q (Oct 2023 · Paper II · Q9(a,b,d)): A 65-year-old male presented with recent history, nausea and loss of appetite and dark coloured stools, he was pale and his haemoglobin was 6.5gm%. a) What clinical diagnosis you would offer as the cause of his anemia? [2] b) What all points you will elicit in history to find out the possible causes of anemia? [2] d) What medications can cause anaemia? [2]

SOURCE MUR — Anaemia (Ch. 13) — pp. 126–132

1. Clinical diagnosis

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: **iron-deficiency anaemia from chronic GI blood loss**. Iron deficiency is the commonest cause of anaemia, and it is caused by bleeding until proved otherwise. Dark stools (melaena) fit this. Acute haemorrhage, usually haematemesis or melaena, is the commonest cause of normocytic anaemia.
 - Serious disorders not to be missed: **carcinoma** (stomach, colon), peptic ulcer, and bleeding from NSAID therapy. Also bone marrow failure or infiltration, and myelodysplasia in the elderly.
 - Pitfalls: the symptoms are non-specific. A therapeutic trial of iron without investigation is indefensible. Failure of iron therapy suggests ongoing loss or a wrong diagnosis.
 - Masquerades: anaemia is a masquerade. It may present with undifferentiated symptoms, or with worsening ischaemia, heart failure or claudication.
 - Is the patient trying to tell me something?: nausea, anorexia and weight loss may point to an upper GI malignancy. Alcohol and drug use may be hidden causes.
 - Indian layer: nutritional deficiency (iron, folate, B12), chronic blood loss, **worm infestation** and malaria are the main causes.
- Working diagnosis: severe (Hb 6.5 g/dL) **chronic blood-loss iron-deficiency anaemia, probably from an upper GI lesion** (peptic ulcer, NSAID gastropathy or gastric carcinoma).
 - WHO anaemia threshold: <130 g/L in men.
 - Expected picture: microcytic hypochromic cells, low ferritin (<30 mcg/L) and low serum iron.
 - Confirm with FBE, iron studies, and endoscopy or colonoscopy to find the source.

2. Points to elicit in history

- Symptoms of anaemia: fatigue, dyspnoea, palpitations, angina, claudication, dizziness, pica.
- Blood loss:
 - Melaena, haematemesis, rectal bleeding, haemorrhoids.
 - Dyspepsia, ulcer symptoms, reflux, hiatus hernia.
 - Weight loss, change in bowel habit (carcinoma).
- Drugs: NSAIDs, aspirin, anticoagulants.
- Diet and nutrition:
 - Inadequate diet, and strict vegetarian or fad diets.
 - Folate deficiency: poor diet, alcoholism, small-bowel disease.
- B12 deficiency: previous gastric surgery, ileal disease or surgery, pernicious anaemia. Also PPI or H2-blocker use, metformin and HIV.
- Alcohol intake: causes macrocytosis and is easily missed.
- Haemolysis: abrupt onset with mild jaundice, dark urine.

- Past and family history: haemoglobinopathy and thalassaemia (north and central India). Also chronic disease, kidney disease and hypothyroidism.
- Indian layer: hookworm and other worm infestation, deworming history, recent malaria.
- Examination pointers: pallor, koilonychia, angular cheilosis, jaundice.

3. Medications that can cause anaemia

Table 1: Drug-induced anaemia (mechanism and examples)

Mechanism	Drugs
GI blood loss, then iron deficiency	NSAIDs, anticoagulants
Macrocytosis (folate antagonism or marrow effect)	Methotrexate, 5-fluorouracil, azathioprine, cotrimoxazole, pyrimethamine, zidovudine
Anticonvulsant effect	Phenytoin, primidone, phenobarbitone
Low B12 absorption or levels	H2-receptor blockers, PPIs, OCP, metformin
Haemolysis	Sulfamethoxazole, antimalarials, some anti-inflammatories
G6PD-deficient haemolysis	Oxidant drugs such as sulfonamides
Marrow aplasia	Drugs and radiotherapy

- Cytotoxic drugs may cause anaemia or pancytopenia.
- Macrocytosis from drugs needs correction only if anaemia or another cytopenia is present.
- In this patient, an NSAID or anticoagulant is the most likely culprit.

PEARLS

- Iron-deficiency anaemia in an elderly man means GI malignancy until excluded.
- Best test to monitor iron stores: serum ferritin.
- B12 deficiency: serum B12 <148 pmol/L.
- Always ask about NSAID, aspirin and anticoagulant use.
- In India, also think of hookworm and malaria.

Web sources: [W1] MoHFW/NHM — Anemia Mukht Bharat Operational Guidelines — <https://nhm.gov.in/images/pdf/Nutrition/AMB-guidelines/Anemia-Mukt-Bharat-Operational-Guidelines-FINAL.pdf>

98. Blood transfusion – indications, risks, donor testing, ward precautions

ASKED 1* · 10-mark answer

Asked in: Dec 2022 · Paper II · Q5 (10 marks)

Q (Dec 2022 · Paper II · Q5): Mrs. Satya aged 40 years, presented to outpatient department with history of tiredness and fatigue, she gives history of heavy menstrual bleeding for 5 days, and on examination she is pale. a) What are the indications of blood transfusion? [2] b) What are the risks and complications of blood transfusion? [3] c) What tests will you do on the donor blood before transfusion? [2] d) What measures will you take before, during and after the transfusion in the ward? [3]

SOURCE HAR — ch. 118 Transfusion Therapy and Biology — pp. 901, 905, 910, 912–913

Indications of blood transfusion

- **Purpose:** blood components are used to prevent or treat anaemia, haemorrhage and bleeding disorders.
- **Components and indications:** red cells for anaemia or blood loss, platelets for thrombocytopenic bleeding, and plasma for coagulopathy. Blood components are scarce, life-saving resources, so transfusion is used only when necessary.
- **Red-cell trigger (AABB 2023, adults):** start transfusion when Hb is <7 g/dL (restrictive strategy).
 - Restrictive thresholds did not adversely affect patient-important outcomes in most populations.
 - Safety is uncertain in acute or chronic ischaemic cardiac disease.
- **Mrs. Satya (menorrhagia, chronic anaemia):**

- Transfuse only if she is haemodynamically unstable, has severe symptomatic anaemia or has Hb below the trigger. Severe anaemia is referred to hospital.
- Otherwise treat the cause and give oral IFA. Mild–moderate anaemia gets oral IFA at home with follow-up every 2 weeks for 2 months. If Hb does not rise, refer for other causes.
- Patient blood management means optimising haematopoiesis, treating iron deficiency and minimising blood loss.

Risks and complications of blood transfusion

Table 1: Complications of transfusion

Type	Complication	Key points
Immune	Acute haemolytic reaction	Recipient preformed antibodies lyse donor red cells, during or within 24 h. Anti-A/anti-B cause the most severe reactions. Usually due to a patient or product identification error.
Immune	Delayed haemolysis	Icterus and persisting or worsening anaemia. The alloantibody becomes detectable 1–2 weeks later.
Immune	Alloimmunisation	Anti-RBC, anti-HLA and anti-HPA antibodies. HLA/HPA antibodies cause fever and platelet refractoriness.
Immune	TRALI	Severe lung injury from donor anti-HLA/anti-HNA antibodies.
Immune	FNHTR, GVHD	Leukocyte reduction lowers FNHTR. Irradiation prevents GVHD in the immunosuppressed.
Non-immune	TACO	Dyspnoea, hypoxia, bilateral infiltrates, systolic hypertension, raised BNP. It is the main cause of transfusion death.
Non-immune	Massive transfusion	Citrate toxicity (hypocalcaemia), hypothermia, hyperkalaemia, dilutional coagulopathy.
Non-immune	Iron overload	Each RBC concentrate has 200–250 mg iron. Assess by ferritin or MRI and treat with chelation.
Non-immune	Hypotensive reaction	BP drop >30 mmHg early in the transfusion. More likely with ACE inhibitors.
Infectious	Bacterial contamination	Abrupt fever and chills, then septic shock or DIC. Take cultures and start broad-spectrum antibiotics.
Infectious	Viral, parasitic	HIV, HBV, HCV, HTLV, CMV, syphilis, malaria. Residual risk is low with screening.

- Acute haemolytic reaction can present with hypotension, tachycardia, fever, chills, chest and back pain, and haemoglobinuria. DIC, renal failure, shock and death may follow.
- Causes of transfusion-associated death (FDA 2017–21): TACO 32%, TRALI 21%, haemolysis 21%, microbial contamination 13%.
- Rh(D)-negative females of childbearing potential given D-positive red cells should receive anti-D.

Tests on donor blood before transfusion

- **Donor selection:** healthy donors without high-risk lifestyles, medical conditions or exposure to transmissible pathogens.
- **Infection screening:** each unit is tested for antibodies or antigens, or directly by nucleic acid amplification (NAT).

Table 2: Screening of donated blood (HAR Table 118–6)

Pathogen	Test
HIV-1/2	Serology, NAT
HBV	Serology, NAT
HCV	Serology, NAT
Syphilis	Serology
Malaria	Serology
CMV, HTLV	Serology plus leukocyte reduction

- **Compatibility testing:** ABO and D typing of the unit and the recipient, antibody screen and crossmatch.



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HOW TO USE

Each answer groups every year and paper in which the question was asked ("Asked in") and answers the union of the parts asked. The badge shows how often it was asked. The SOURCE line under the questions names the book chapters and pages and the guideline documents used. Amber MANAGEMENT BASIS strips name the Government of India document first, then the international one. Slate boxes give Murtagh's safe diagnostic strategy with the Indian layer; teal boxes say when to refer; green boxes are exam pearls. A lists the parts, B this volume question by question, C the high-yield list (asked 3× or more).

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PART 30

General Medicine – Infectious Diseases

169. Paediatric TB – diagnosis, treatment, prevention, advice to anganwadi

ASKED 1* · 10-mark answer

Asked in: Dec 2022 · Paper III · Q10 (10 marks)

Q (Dec 2022 · Paper III · Q10): A 5-year-old child was brought by his mother with cough, and mild fever for past 2 weeks. His weight is 13 kg (Birth wt-2.9kg). His father was treated for pulmonary TB 3 months back: a) Discuss diagnosis of TB in this child. [2] b) Discuss the treatment of pediatric TB as per National TB elimination program. [4] c) What measures could have prevented the child from being infected by his father? [2] d) What advice will you give to the anganwadi that the child is attending? [2]

SOURCE GHAI — Tuberculosis (Epidemiology, Diagnosis, Treatment) — pp. 255–260 · PSM — Tuberculosis, TB preventive treatment — p. 235

1. Diagnosis of TB in this child

- **Presumptive TB:** fever or cough for more than 2 weeks, weight loss or no weight gain, and a history of contact all make a child presumptive TB, who must be evaluated.
- This child has cough and fever for 2 weeks, a weight of 13 kg that needs a growth-chart check, and a father treated for pulmonary TB 3 months ago. That is a household contact, defined as a child living with an adult on or recently on antitubercular therapy (ATT).
- Diagnosis rests on clinical features, chest X-ray, tuberculin test and contact history. Microbiological confirmation is the gold standard but is often not possible because childhood TB is paucibacillary.
- Microbiological confirmation (in presumptive intrathoracic TB, seek it by rapid molecular test, culture or smear):
 - Specimens: sputum by expectoration or induced sputum, or an early-morning gastric aspirate (two samples).
 - **CBNAAT / TrueNat** is preferred. The result comes in under 2 hours and also shows rifampicin resistance.
 - Culture on MGIT; ELISA serology has no role in children.
- **Mantoux test:** inject 0.1 mL of PPD (5 TU) intradermally and read induration at 48–72 hours. A negative test does not exclude TB.
- **Chest X-ray:** if the X-ray suggests TB, send gastric aspirate or induced sputum for smear, Xpert and MGIT. If it does not, give antibiotics for 7–10 days and repeat the X-ray if symptoms persist.
- Look for features of drug resistance: a contact with drug-resistant TB, or irregular treatment in the contact.
- NTEP tests upfront for rifampicin resistance with an approved rapid NAAT in all TB patients.

2. Treatment of paediatric TB under NTEP

MANAGEMENT BASIS

India: NTEP, Central TB Division, MoHFW, Paediatric TB Management Guideline, 2022 (weight-band dosing as in the NTEP module) · International: principles similar to adults

- Treatment is daily and given as weight-band fixed-dose combinations. The standard is **2 months HRZE** (intensive phase) followed by **4 months HRE** (continuation phase), 6 months in all. NTEP weight-band tables use HRZ plus separate ethambutol tablets in the intensive phase and HR plus ethambutol in the continuation phase.
- Three drugs are used in the continuation phase because of increasing isoniazid resistance.
- Add pyridoxine 10 mg/day.

Table 1: NTEP paediatric weight-band dosing for this child (13 kg)

Phase	Formulation	Tablets/day (12–15 kg)
Intensive (2 months)	HRZ 50/75/150 mg + E 100 mg	3 + 3
Continuation (4 months)	HR 50/75 mg + E 100 mg	3 + 3

- Give the drugs under direct observation, and move the child to the next weight band when weight crosses it.

- Notify the case (Nikshay) and arrange nutritional support. Every person with TB is assessed for comorbidity and undernutrition.
- Review the child every 2–4 weeks at first, then every 4–8 weeks, and check weight gain and adherence.
- Take the first chest X-ray at 8 weeks. If there is little change with a slow clinical response, extend the intensive phase by one month.
- If the child worsens or does not respond, review the diagnosis and compliance and consider drug resistance.
- Review every 3–6 months for 2 years after completing therapy.
- Prednisolone 1–2 mg/kg/day for 4–6 weeks is for CNS, endobronchial or severe miliary TB.

3. Measures that could have prevented the infection

- **Early diagnosis and treatment of the father:** infection spreads by inhaled droplets from open (infective) cases. The risk rises with the extent of contact and the bacillary load in sputum.
- **Contact tracing:** screen all household contacts of a confirmed pulmonary TB patient for symptoms and X-ray, and rule out active TB.
- **TB preventive treatment (TPT):**
 - NTEP covers all household contacts of microbiologically confirmed pulmonary TB, regardless of age.
 - Under-5 contacts get treat-only TPT after active TB is excluded.
 - The regimen is 3RH for 3 months (84 doses) for those under 15 years. 3HP (12 weekly doses) is for contacts aged 2 years or more.
 - GHAI advises isoniazid 10 mg/kg/day for 6 months for contacts under 5 years.
- **Host factors:** infection is commoner in younger and severely malnourished children and those without BCG vaccination. Good nutrition and BCG at birth reduce the risk.

4. Advice to the anganwadi

- Identify children with fever or cough over 2 weeks, weight loss or no weight gain, or a TB contact, and refer them for evaluation.
- Ask about household TB contacts among enrolled children. Under-5 contacts need TPT after active TB is excluded.
- Support treatment adherence for children on ATT, including daily dosing, completion of 6 months and follow-up visits.
- Provide supplementary nutrition and monitor growth, because undernourished children are more susceptible.
- Under-nourished children who do not respond to dietary therapy should be investigated for TB.

PEARLS

- Presumptive childhood TB: fever or cough over 2 weeks, weight loss, and a contact.
- The best specimen in children is the early-morning gastric aspirate; CBNAAT also gives rifampicin resistance.
- Paediatric NTEP regimen: 2HRZE/4HRE with daily weight-band dosing.
- 12–15 kg band: 3 tablets each of HRZ and E in the intensive phase.
- Under-5 household contacts: TPT after excluding active TB, with no infection test.
- Trap: a negative Mantoux test does not exclude TB.

Web sources: [W1] NTEP, Central TB Division — Module 6 (paediatric weight-band drug table) — 2020 — <https://tbcindia.mohfw.gov.in/wp-content/uploads/2023/05/030920201430Module6140120CTD.pdf> · [W2] ICMR — Standard Treatment Workflow, DS-TB treatment per NTEP — https://www.icmr.gov.in/icmrobject/uploads/STWs/1725964686_2_ntep_18032022.pdf · [W3] NTEP — Guidelines for Programmatic Management of TB Preventive Treatment (FAQ document) — 2021 — https://tbcindia.mohfw.gov.in/wp-content/uploads/2023/05/7882122892Frequently_Asked_Questions_PMTPT.pdf · [W4] NTEP — Guidance Document on TB Mukh Bharat Abhiyaan — 2025 — https://tbcindia.mohfw.gov.in/wp-content/uploads/2025/09/Guidance-Documents-on-TB-Mukh-Bharat-Abhiyan_0.pdf

170. Meningitis in a 2-year-old – organisms, management, referral

ASKED 1* · 10-mark answer

Asked in: Jun 2025 · Paper III · Q1 (10 marks)

Q (Jun 2025 · Paper III · Q1): A 2-year-old boy was brought by his mother with complaints of fever, headache associated with vomiting for past 2 days. He is drowsy since this morning. On examination, he is febrile (103°F), conscious, lethargic and there was neck stiffness. There was no weakness in the extremities. a) What are your diagnosis and differential diagnoses? [2] b) What are the common organisms which cause the above condition? How will you manage this child in family practice? [5] c) What are the complications during the treatment that would need referral to the higher center? [3]

SOURCE HAR — ch. 143 Acute Meningitis — pp. 1120–1122, 1124 · MUR — Infections of the central nervous system — pp. 199–201

Diagnosis and differential diagnosis

- **Provisional diagnosis: acute bacterial meningitis.** The child has fever, headache, vomiting, drowsiness and neck stiffness. The cause is presumed bacterial until proven otherwise.
 - Kernig's and Brudzinski's signs are of uncertain sensitivity and specificity. They may be absent in very young or depressed patients, so their absence does not exclude meningitis.
 - Antibiotics can mask symptoms. Suspect meningitis in a child with fever for more than 3 days on antibiotics.
 - Look for a non-blanching purpuric rash, which signals meningococcaemia. The rash begins as a viral-like maculopapular eruption and rapidly becomes petechial.



FIGURE 20.4 Meningococcaemia with typical early purpuric rash in a 2-year-old child.

FIG. 20.4 — reproduced from Murtagh's General Practice 9e, p. 200.

- Septic shock may develop without signs of meningitis.

Table 1: Differential diagnosis

Differential	Pointer
Viral meningitis	Fewer meningeal signs, benign course. CSF shows lymphocytes with normal glucose
Tuberculous meningitis	Subacute onset. CSF shows lymphocytes with low glucose
Viral/HSV encephalitis	Altered behaviour or consciousness, focal deficit, seizures
Cerebral malaria	Must be considered in fever with altered sensorium
Brain abscess / subdural empyema	Focal signs, raised ICP
Other fungal or partially treated bacterial causes	Lymphocytic CSF, slow cultures

- Indian layer: in an Indian child, malaria and TB meningitis must be actively excluded. For TB meningitis, all extrapulmonary TB patients are risk-assessed for drug resistance before treatment.

Common organisms and management in family practice

MANAGEMENT BASIS

India: NTEP, Central TB Division, MoHFW — INDEX-TB Guidelines

Common organisms

- *S. pneumoniae* and *N. meningitidis* are the commonest causes of community-acquired bacterial meningitis.
- *H. influenzae* is also a cause. Group B streptococcus and *Listeria* are mainly seen in infants under 3 months.
- Fulminant cases are due to meningococcal septicaemia, *H. influenzae* type b, *S. pneumoniae* or *Listeria*.
- Viral causes include enteroviruses and HHV-6.

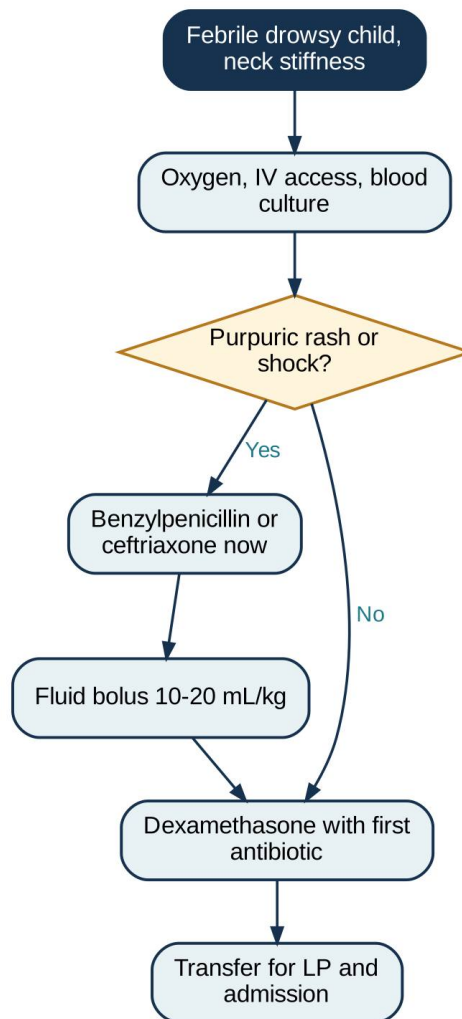
Management at primary care

MANAGEMENT BASIS

International: MUR 9e, ch. 20; HAR 22e, ch. 143

This is a medical emergency. The goal is antibiotics within 60 minutes of arrival. The child must be admitted. The family physician stabilises and gives pre-referral treatment.

Flowchart I: Primary-care pathway



- **First actions:** give oxygen, obtain IV access, and take blood cultures (within 30 minutes of assessment, ideally before hospitalisation).
- **Fluids:** give a bolus of 10–20 mL/kg normal saline. Continue up to a total of 60 mL/kg if there are signs of hypoperfusion.
- **Lumbar puncture:**
 - This is done in hospital, not in the clinic.
 - LP without prior imaging is considered safe only if consciousness is normal and there is no papilloedema or focal deficit.
 - If LP is delayed, give empirical antibiotics after blood cultures.
- **Dexamethasone:** 0.15 mg/kg (maximum 10 mg) IV, started at the same time as or about 15 minutes before the antibiotic. HAR advises starting it ideally 20 minutes before, or no later than concurrent with, the first antibiotic dose.
- **Empirical antibiotic (child >3 months):** a third-generation cephalosporin plus vancomycin.
 - Ceftriaxone **100 mg/kg/day IV, 12-hourly**, or cefotaxime 225–300 mg/kg/day, 6-hourly.
 - Vancomycin **45–60 mg/kg/day, 6-hourly**.
 - Pre-referral dose: ceftriaxone 50 mg/kg (maximum 2 g) IV, or IM if IV is not possible.
- **Suspected meningococcaemia:** give benzylpenicillin before reaching hospital, 60 mg/kg IV (maximum 2.4 g). The dose guide in a child is 300 mg if under 1 year, 600 mg at 1–9 years and 1.2 g at 10+ years. Use IM if IV access fails, and ceftriaxone if penicillin-hypersensitive.
- **In hospital:**
 - Tailor therapy to the organism and its susceptibility.
 - Uncomplicated meningococcal meningitis needs 7 days of IV antibiotics.
 - A CSF picture of PMN pleocytosis, glucose <2.2 mmol/L and protein >0.45 g/L confirms bacterial meningitis.

- **Family and community follow-up:**

- Give chemoprophylaxis to close contacts in meningococcal disease: rifampin 10 mg/kg 12-hourly for 2 days in children over 1 year, and 600 mg 12-hourly for 2 days in adults.
- Alternatives for adult contacts are azithromycin 500 mg once or ceftriaxone 250 mg IM once. Rifampin is not recommended in pregnancy.
- Close contacts are those with exposure to oropharyngeal secretions, for example through kissing or shared toys or beverages.

REFER WHEN

- Refer **every** suspected case to hospital after pre-referral treatment, with no delay for investigations.
- Send urgently, with a clinician escorting, if there is purpura or shock, a falling level of consciousness, or seizures.
- Send with oxygen and IV access in place, and a written note of the doses and times given.

Complications during treatment needing referral**MANAGEMENT BASIS**

International: HAR 22e, ch. 143; MUR 9e, ch. 20

- **Raised ICP and herniation:**

- Signs are falling consciousness, papilloedema, dilated poorly reactive pupils, sixth-nerve palsy, decerebrate posturing, and the Cushing reflex (bradycardia, hypertension, irregular respiration).
- Herniation occurs in 1–8% of cases.

- **Seizures:** these occur in 15–40% of patients. Focal seizures suggest arterial ischaemia or infarction, cortical venous thrombosis or focal oedema. Generalised seizures or status epilepticus may be due to hyponatraemia, cerebral anoxia or drug toxicity.
- **Focal deficit or stroke:** cytotoxic oedema, cerebral ischaemia or infarction.
- **Hydrocephalus:** exudate in the subarachnoid space obstructs CSF outflow and resorption.
- **Meningococcal septicaemia or shock:** the child may deteriorate despite treatment with purpura and hypoperfusion.
- **Focal suppurative infection:** a focal deficit needs prompt MRI to look for empyema or abscess.
- **Drug-related problems:** cefepime can cause seizures, myoclonus and encephalopathy.
- **Failure to respond:** resistant pneumococcus needs vancomycin, with rifampin as an adjunct.

PEARLS

- Bacterial meningitis is an emergency: give antibiotics within 60 minutes of arrival and never delay for LP or imaging.
- A non-blanching purpuric rash means meningococcaemia, so give benzylpenicillin or ceftriaxone before transfer.
- Commonest organisms are *S. pneumoniae* and *N. meningitidis*.
- Empirical regimen for a child over 3 months: ceftriaxone or cefotaxime plus vancomycin, with dexamethasone.
- Bacterial CSF shows PMNs, glucose <2.2 mmol/L and protein >0.45 g/L. Lymphocytes with low glucose suggest TB or fungal meningitis.
- Seizures (15–40%) and raised ICP are the commonest reasons for urgent referral.
- Rifampin for 2 days is the contact prophylaxis for meningococcal disease.

Web sources: [W1] NTEP, Central TB Division, MoHFW — INDEX-TB Guidelines — <https://tbcindia.mohfw.gov.in/wp-content/uploads/2023/05/5585665076Index-TB-Guidelines.pdf>

171. Serodiscordant couple – condom rupture (PEP) & planning conception

ASKED 1* · 10-mark answer

Asked in: Apr 2023 · Paper III · Q2 (10 marks)

Q (Apr 2023 · Paper III · Q2): Mr. B, an HIV positive patient, with suppressed viral load gets married. The wife knows his condition and the couple is practising safe sex. Mr. B gives a frantic call saying that the condom ruptured during intercourse. a) What advice will you provide to the couple? [5] b) After 2 years of marriage, they decide to conceive a child. What advice and precautions will you give? [5]

SOURCE MUR — Ch. 18 (HIV, PEP, PrEP, counselling); Ch. 106 Subfertility (fertility awareness) — pp. 178, 1194 · HAR — Ch. 208 HIV Disease: transmission, HIV and the health care worker, prevention — pp. 1562, 1625–1626

a) Advice to the couple after the condom rupture

- **Reassure and treat it as an exposure.** A serodiscordant couple with a ruptured condom should be treated as exposed, and PEP started within 72 hours.
 - Mr. B's suppressed viral load makes transmission very unlikely. Sexual transmission did not occur in studies of couples where the partner with HIV was virally suppressed.
 - The wife should still be offered PEP, because the risk is not zero and the viral load is a past result.
- **Act now, because time matters.** Tell them to attend at once, ideally within hours. PEP should be started as early as possible and definitely within 72 hours (3 days).
 - PEP is not recommended more than 72 hours after exposure.
- **Do a quick risk assessment.** Confirm the time since exposure, the nature of the exposure and Mr. B's latest viral load.
 - Estimated per-act risk without ART or condom is 8 per 10,000 for receptive penile-vaginal intercourse.
 - Ask about pregnancy, because pregnancy affects the choice of PEP.
- **Give PEP.** Use 2–3 antiretroviral agents daily for 28 days. The US guideline uses three or more drugs for 4 weeks.
 - Prescribe the drugs per the NACO guidelines.
 - Stress adherence to the full 28 days.
- **Counsel and test.**
 - Counselling needs the "three Cs": counselling, confidentiality and consent.
 - Do a baseline HIV test for the wife, with follow-up testing and monitoring for drug toxicity.
 - Arrange follow-up within 72 hours, concluding about 4 months after exposure.
- **Safer sex until the follow-up result is clear.**
 - Reinforce consistent condom use. Condoms also prevent unwanted pregnancy and other STIs.
 - Most failures come from breakage or improper use, such as not wearing the condom for the whole act. Use latex condoms, and never use petroleum-based lubricants, which increase rupture.
- **Prevent future exposures.** If exposure is going to continue, the wife can start PrEP after the 28-day PEP course.

b) Advice and precautions for planning conception

- **Keep Mr. B's viral load suppressed.**
 - Continue ART with strict adherence and regular viral load checks.
 - "Undetectable equals untransmittable" (U = U): no sexual transmission occurred when the partner with HIV was suppressed, even without condoms or PrEP.
 - Seek the NACO-recommended preconception review, and advise on the conception plan at the ART centre.
- **Give the wife PrEP as an added precaution.**
 - Oral emtricitabine + tenofovir disoproxil fumarate, taken daily or on demand, is 99% effective with strict adherence.
 - Cabotegravir injections have similar or better efficacy.
 - Follow the NACO PrEP technical guidelines.
- **Time intercourse to ovulation, so there are fewer exposures.**
 - Intercourse every 2 days in the week before expected ovulation is ideal.

- Ovulation occurs about 14 days before menstruation. Egg-white cervical mucus marks the fertile time.
- The ovum survives up to 24 hours and sperm up to 5 days.
- **Screen and treat STIs in both partners.** Genital ulcerative disease is associated with HIV transmission, so effective STI management is part of HIV control.
 - Also test and treat for syphilis.
- **Optimise general health before conception.**
 - Optimise weight, exercise, smoking cessation and minimal alcohol.
 - Fertility declines with age, and both partners should be assessed if conception is delayed.
- **Stay in touch with HIV services.** On confirmed pregnancy, the wife should register early for ANC and PPTCT. Elimination of vertical transmission now runs under the 2024 national guideline combining HIV and syphilis.
 - Warn that HIV can pass to the infant intrapartum, perinatally or via breast milk.
- **Counsel and support.** Use pre-test style counselling with confidentiality and consent.
 - Contacts and partners are offered testing and counselling.

PEARLS

- PEP: start ideally within hours and no later than 72 hours, for 28 days.
- Treat a condom rupture in a serodiscordant couple as an exposure, even with a suppressed viral load.
- U = U: a suppressed viral load stops sexual transmission.
- PrEP for the HIV-negative partner is 99% effective with adherence.
- Elimination of vertical transmission of HIV and syphilis: NACO 2024 guideline.

Web sources: [W1] NACO, MoHFW — National Guidelines for HIV Care and Treatment — 2021 — <https://naco.mohfw.gov.in/division/care-support-and-treatment/care-support-and-treatment-archive/> · [W2] NACO — National Guidelines for Elimination of Vertical Transmission of HIV and Syphilis — 2024 — <https://naco.gov.in/documents/policy-guidelines> · [W3] NACO — National Technical Guidelines for Pre-Exposure Prophylaxis — <https://www.naco.gov.in/naco-updates>

PART 31

General Medicine – Haematology & Transfusion

172. Anaemia in adolescent girl – investigations, prevention, treatment

ASKED 1* · 10-mark answer

Asked in: Dec 2020 · Paper III · Q7 (10 marks)

Q (Dec 2020 · Paper III · Q7): A 13-year-old girl is brought to you with a history of tiredness. On examination, you find that she is pale and undernourished. a) What are the investigations that you will conduct? [5] b) What are the prevention and treatment modalities for anemia in [5]

SOURCE HAR — Ch. 102 Iron Deficiency and Other Acquired Anemias — pp. 765–767 · PSM — Anaemia Mukh Bharat; Community Nutrition Programmes — pp. 534, 791

Investigations

- **Aim:** confirm anaemia, define its type, then find the cause. In a pale, undernourished adolescent girl the usual causes are iron deficiency, worms and heavy menstrual loss. Diagnosing iron deficiency is a two-step process: laboratory tests first, then the cause.
- **First-line tests**
 - **Hb by point-of-care or digital method:** AMB uses digital testing with point-of-care treatment, and school-going adolescents are screened annually.
 - **CBC with indices:** MCV <80 fL in established iron deficiency, but it can be normal early. RDW is often raised.
 - **Peripheral smear:** microcytic hypochromic picture, anisocytosis. Look also for parasites and target cells.
 - **Reticulocyte count:** this is the baseline for judging response to treatment.

- **Malaria smear or rapid test:** do this in endemic areas, because malaria is a non-nutritional cause of anaemia that AMB targets.
- **Stool for ova and occult blood:** hookworm and other parasites cause chronic gut blood loss.
- **Second-line tests (selective)**
 - **Serum ferritin:** $<30 \mu\text{g/L}$ has sensitivity 92% and specificity 98% as a single test for iron deficiency.
 - **Transferrin saturation:** iron-restricted erythropoiesis at $<15\text{--}20\%$.
 - **Hb electrophoresis or HPLC:** needed when microcytosis is out of proportion to iron status or ferritin is normal. Haemoglobinopathies are an AMB target.
 - **Serum B12 and folate:** if MCV is high or the smear is macrocytic. Serum cobalamin is the first-line test, and $<148 \text{ pmol/L}$ (200 ng/L) with symptoms or indices defines deficiency.
 - **Other tests, guided by history:** coeliac serology and *H. pylori* testing for poor absorption, and a bleeding work-up if menses are heavy.
 - **Urine routine, renal and thyroid function:** if the picture suggests chronic disease.

Table 1: Interpreting iron indices

Parameter	Iron deficiency	Anaemia of inflammation	Thalassaemia trait
Ferritin	Low ($\leq 15\text{--}30 \mu\text{g/L}$)	Normal to high (>100)	Normal to high
Transferrin saturation	Low ($<10\%$)	Low ($<20\%$)	Normal to high
MCV	Low	Low to normal	Low
RDW	High	Normal	Low to normal

- **Interpretation:** low ferritin and high RDW point to iron deficiency. Normal or high ferritin with low MCV points to thalassaemia trait.
- **Cut-offs:** AMB and NFHS use the older Hb cut-offs. WHO 2024 revised the cut-offs for children aged 6–23 months, second-trimester pregnancy and altitude.

Prevention and treatment of anaemia in the adolescent girl

MANAGEMENT BASIS

India: MoHFW/NHM — Anemia Mukht Bharat Operational Guidelines (6x6x6) — 2018 · International: WHO — Haemoglobin cutoffs guideline — 2024; HAR 22e, ch. 102

Prevention (Anemia Mukht Bharat)

- **Why girls are at risk:** adolescent iron need is **1.2–1.5 mg/day**. NFHS-5 (2019–21) found **59.1%** of adolescent girls anaemic.
- **AMB interventions:**
 - Prophylactic iron and folic acid supplementation.
 - Deworming.
 - Year-round behaviour change communication.
 - Testing and treatment using digital methods and point-of-care treatment, with special focus on pregnant women and school-going adolescents.
 - Fortified foods in public programmes.
 - Non-nutritional causes in endemic pockets: malaria, haemoglobinopathies and fluorosis.
- **Prophylactic dose, ages 10–19 years:** **1 blue tablet weekly**, containing 60 mg elemental iron + 500 mcg folic acid. It covers school-going and out-of-school girls.
- **Delivery:** weekly IFA tablets for adolescents 10–19 years.
- **Deworming:** National Deworming Day.
- **Malaria:** treat and prevent it through NCVBDC (NVBDCP), because iron supplementation may worsen malaria unless malaria control is in place.
- **Diet:** iron-rich foods and fortified foods. Counsel against tea and calcium with meals, which inhibit iron absorption.

- **Counselling:** menstrual hygiene, and early treatment of heavy bleeding.

Treatment

MANAGEMENT BASIS

India: MoHFW/NHM — Anemia Mukht Bharat Operational Guidelines (6x6x6) — 2018 · International: HAR 22e, ch. 102; NICE — Vitamin B12 deficiency in over 16s (NG239) — 2024

- **Severity triage:**
 - Severe anaemia is referred to hospital.
 - Mild–moderate anaemia gets oral IFA at home, with follow-up every 2 weeks for 2 months.
 - If Hb does not rise, refer to look for other causes.
- **Oral iron (first choice in mild–moderate anaemia):**
 - Iron sulfate, **65–100 mg elemental iron** once or twice daily, or on alternate days.
 - Alternate-day dosing maximises absorption and is better tolerated.
 - Take with 80 mL orange juice.
 - Continue for **at least 3 months** to replenish stores.
 - GI side effects occur in 30–60% of patients, so counsel in advance.
- **Response check:** no reticulocytosis at 1 week, or a rise in Hb of **<1 g/dL at 2 weeks**, is an inadequate response. Look for non-compliance, ongoing loss or malabsorption.
- **IV iron:** for intolerance, malabsorption, or rapid correction of Hb **≤8 g/dL**. Latest-generation preparations have a good safety profile, and reactions occur in <0.1% of cases.
- **Transfusion:** avoid it unless the patient is haemodynamically unstable or rapidly deteriorating.
- **Treat the cause:**
 - Anthelmintic therapy for worms.
 - Gynaecological care for heavy menstrual bleeding.
 - Management of thalassaemia or other haemoglobinopathy.
 - Vitamin B12 replacement if deficient. Replace B12 first if folate deficiency coexists, to avoid subacute combined degeneration.

PEARLS

- Iron deficiency is the commonest cause of adolescent anaemia. Serum ferritin **<30 µg/L** is the best single test.
- AMB is 6x6x6. Adolescents get a weekly blue tablet (60 mg iron + 500 mcg folic acid).
- Mild–moderate anaemia: oral IFA and review every 2 weeks for 2 months. Refer severe anaemia, or any case with no Hb rise.
- A Hb rise of <1 g/dL at 2 weeks means non-compliance, ongoing loss or malabsorption.
- Normal or high ferritin with low MCV suggests thalassaemia trait. Do not give iron blindly.
- Do not transfuse iron-deficiency anaemia unless the patient is unstable.

Web sources: [W1] MoHFW/NHM — Anemia Mukht Bharat Operational Guidelines (6x6x6) — <https://nhm.gov.in/images/pdf/Nutrition/AMB-guidelines/Anemia-Mukht-Bharat-Operational-Guidelines-FINAL.pdf> · [W2] NICE — Vitamin B12 deficiency in over 16s: diagnosis and management (NG239) — 2024 — <https://www.nice.org.uk/guidance/ng239> · [W3] WHO — Guideline on haemoglobin cutoffs to define anaemia in individuals and populations — 2024 — <https://www.who.int/publications/i/item/9789240088542>

PART 32

Geriatric Medicine

173. Elder abuse – warning signs, prevention, legal remedies

ASKED 1* · 10-mark answer

Asked in: Dec 2020 · Paper III · Q10 (10 marks)

Q (Dec 2020 · Paper III · Q10): Elder abuse is becoming a common phenomenon: a) What are the warning signs of this problem that you are likely to see in your practice? [5] b) What are the preventive measures to prevent this issue? [3] c) What are the legal remedies that are available to the elderly in such situations? [2]

SOURCE MUR — The elderly patient (Elder abuse) — p. 1419

a) Warning signs likely to be seen in practice

- **Definition:** a single or repeated act, or lack of appropriate action, within any relationship where trust is expected, causing harm or distress to an older person.
- **Types to look for:** physical, sexual, financial, psychological and social abuse, and/or neglect.
- **Who is at risk (the patient profile that should raise suspicion):**
 - Living alone, functional limitation, multiple morbidities and hospitalisation in the past year.
 - Depressive symptoms are about twice as common in abused older adults.
 - A family history of abuse should heighten alertness.
- **Commonest form in India:** verbal abuse or disrespect. About 5.2% of those aged ≥60 years reported abuse in the year before the survey (LASI Wave 1, 2017–18).
- **Caregiver and relationship clues:**
 - Caregiving burden, mental or neurological disorder in the carer, and poor family relationships are associated with abuse.
 - Low social support is also associated with abuse.
- **Presentation clues:**
 - Behavioural change in an older person (withdrawal, irritability, anxiety). Dementia is a diagnosis of exclusion, so look for other causes of behaviour change, including abuse.
 - New depression or anxiety, and injuries or neglect that the history does not explain.
 - Abuse can cause serious physical injuries and long-term psychological consequences.
- **Detection aid:** the Elder Abuse Suspicion Index (EASI) was developed for primary-care use.
- **Practice approach:** see the patient alone for part of the consultation, and document findings carefully.

b) Preventive measures

MANAGEMENT BASIS

India: MoHFW (DGHS) — NPHCE Operational Guidelines; MoSJE — Elderline 14567 — 2010/2011 · International: WHO — Abuse of older people fact sheet — 2024

- **Primary prevention and awareness:**
 - Combat ageism, which WHO names as a major reason why abuse receives so little attention.
 - Health education on healthy ageing, environmental modification, nutrition and lifestyle at the sub-centre under NPHCE.
- **Caregiver support:**
 - Interventions that relieve the burden of caregiving are among the most promising strategies.
 - Train family caregivers and give special attention to home-bound or bedridden elderly. ANMs and male health workers make domiciliary visits and educate families.
- **Financial protection:**
 - Money-management programmes for older adults vulnerable to financial exploitation.
 - AB PM-JAY gives all citizens aged ≥70 years free treatment up to ₹5 lakh, which reduces health-cost dependence.
- **Early detection and care at each level:**

- A weekly geriatric clinic at the PHC with routine check-ups.
- A 10-bed geriatric ward at the district hospital.
- Multidisciplinary teams, because the response cuts across health, mental health, justice and social services.
- **Helplines and shelters:**
 - Helplines and emergency shelters.
 - Elderline (toll-free **14567**) gives guidance, emotional support and information on schemes, with field intervention and rescue in abuse.
- **Healthcare providers:** training of providers and mandatory reporting are promising responses.

c) Legal remedies available to the elderly

Table 1: Maintenance and Welfare of Parents and Senior Citizens Act, 2007 (Act 56 of 2007) — key provisions

Provision	Content
Senior citizen (s.2)	Citizen of India aged ≥ 60 years
Maintenance (s.2)	Food, clothing, residence, medical attendance and treatment
Application (s.5)	By the senior citizen or parent, or by an authorised person or organisation if the senior is incapable; the Tribunal may also act suo motu
Tribunal order (s.9)	Allowance set by the State, not more than ₹10,000 per month; disposal within 90 days, extendable once by up to 30 days
Compliance (s.13)	Full amount to be deposited within 30 days of the order
Appeal (s.16)	To the Appellate Tribunal within 60 days
Representation (s.17)	No legal practitioner may represent either party
Maintenance Officer (s.18)	Not below the rank of District Social Welfare Officer

- **Choice of remedy:** a senior entitled to maintenance under both CrPC Chapter IX and this Act may claim under either, but not both.
- **Abandonment:** punishable with imprisonment up to 3 months, a fine of ₹5,000, or both.
- **District Magistrate:** must ensure the life and property of senior citizens are protected and that they can live with security and dignity.
- **Help in practice:** Elderline 14567 gives field intervention in abuse and rescue.

PEARLS

- Elder abuse = harm in a trust relationship, including neglect and financial or psychological abuse.
- WHO definition applies to people aged ≥ 60 years; the Indian Act also defines a senior citizen as ≥ 60 years.
- In India, verbal abuse or disrespect is the commonest form.
- National helpline: Elderline **14567**.
- Tribunal order: allowance $\leq$ ₹10,000/month, disposal within 90 days, appeal within 60 days, no lawyers.
- Trap: dementia is a diagnosis of exclusion, so exclude other causes of behaviour change, including abuse.

Web sources: [W1] MoHFW (DGHS) — LASI Wave 1 (2017–18), listed on the NPHCE page — 2017–18 — <https://dghs.mohfw.gov.in/national-programme-for-the-health-care-of-the-elderly.php> · [W2] WHO — Violence Info: Elder abuse (WHO fact sheet, June 2017) — 2017 — <https://apps.who.int/violence-info/elder-abuse/> · [W3] WHO — Preventing abuse of older people — <https://www.who.int/activities/preventing-elder-abuse> · [W4] WHO — A Global Response to Elder Abuse and Neglect (EASI) — <https://extranet.who.int/agefriendlyworld/wp-content/uploads/2014/06/WHO-A-Global-Response-to-Elder-A-buse-and-Neglect-Building-Primary-Health-Care-Capacity-to-Deal-with-the-Problem-Worldwide.pdf> · [W5] WHO — Five priorities for ending abuse of older people — 2022 — <https://www.who.int/news/item/15-06-2022-new-resource-abuse-of-older-people> · [W6] MoHFW (DGHS) — NPHCE Operational Guidelines — 2010/2011 — <https://dghs.mohfw.gov.in/national-programme-for-the-health-care-of-the-elderly.php> · [W7] WHO — Abuse of older people fact sheet — 2024 — <https://www.who.int/news-room/fact-sheets/detail/abuse-of-older-people> · [W8] NHA — AB PM-JAY senior-citizen cover FAQ — https://nha.gov.in/img/resources/English_FAQs_related_to_the_benefits_for_senior_citizens.pdf (PHC and district-hospital levels: NPHCE guidelines, same URL as [W6]) · [W9] MoSJE — Elderline 14567 — <https://www.pib.gov.in/PressReleaseDetail.aspx?PRID=2183196®=3&lang=2> · [W10] WHO — Mental health of older adults fact sheet — <https://www.who.int/news-room/fact-sheets/detail/mental-health-of-older-adults> · [W11] MoSJE — Maintenance and Welfare of Parents and Senior Citizens Act, 2007 — https://www.indiacode.nic.in/bitstream/123456789/8865/1/200756senior_citizenact.pdf

PART 33

Dermatology, Venereology & Leprosy

174. Management of STIs

ASKED 2* · 4–5–mark answer

Asked in: Jun 2022 · Paper III · Q2(b) (5 marks) · Oct 2023 · Paper III · Q7(d) (3 marks)

Q (Jun 2022 · Paper III · Q2(b)): A 35-year old sexually active lady presents to you with vaginal discharge. b) WHO syndromic approach to sexually acquired infections. [5]

Q (Oct 2023 · Paper III · Q7(d)): A 28-year-old female presented to you with complaints of vaginal white discharge. Its curdy, yellowish and foul smelling: d) Write briefly on the management of sexually transmitted infections. [3]

SOURCE MUR — Sexually transmitted infections; Child abuse — pp. 1021, 1211 · NKD — Ch. 15 STIs and HIV — pp. 330, 354

WHO syndromic approach to sexually acquired infections

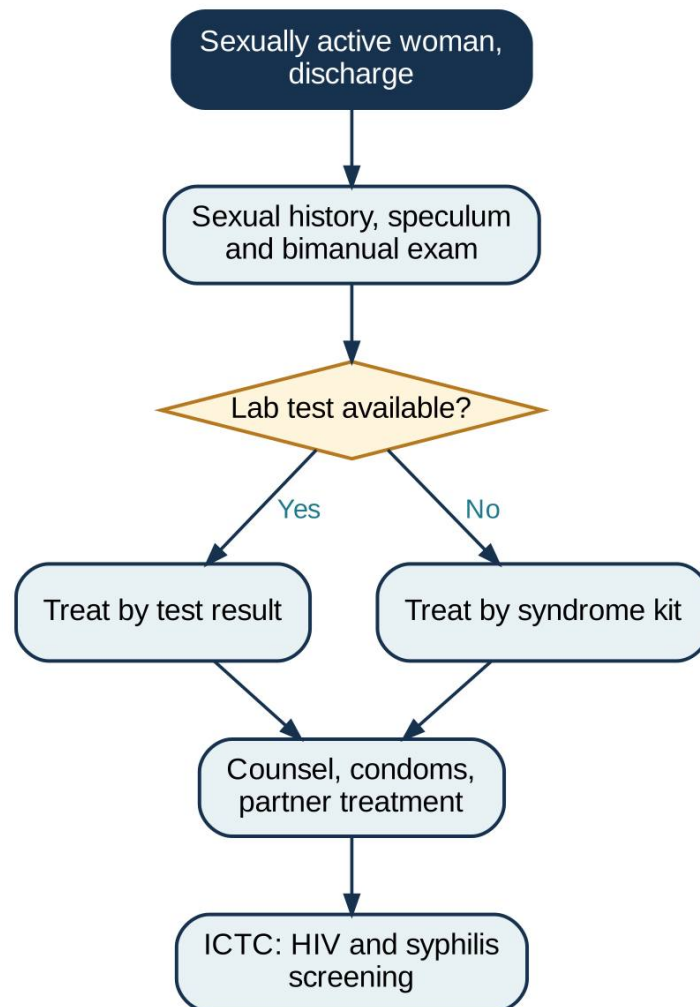
SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: curdy discharge with itch points to vaginitis, which Kit 2 covers in the Indian syndromic scheme. A cervical source cannot be excluded without examination, because Kit 1 also covers cervicitis.
- Serious disorders not to be missed: HIV, syphilis and hepatitis B (baseline testing, repeated at 6 and 12 weeks after exposure), and pregnancy (baseline test).
- Pitfalls: chlamydia and gonorrhoea may need repeat testing at 2 weeks after exposure. Coinfections are common.
- Masquerades: non-specific vulvovaginitis and threadworms can be misread as abuse in a child. In a child, vaginal discharge or an STI is itself an indicator of possible sexual abuse.
- Is the patient trying to tell me something?: take a non-judgmental sexual history, including partners, condom use, previous STI and any unwanted sexual contact.
- Indian layer: syndromic case management is the cornerstone, with laboratory tests used wherever available.

Approach

- WHO 2021 syndromes: urethral discharge (including persistent), vaginal discharge, anorectal infection, genital ulcer disease and lower abdominal pain.
- Where quality-assured molecular assays exist, WHO recommends laboratory-based treatment.
- Where testing is limited, WHO recommends modified syndromic management.

Flowchart 1: Syndromic approach to vaginal discharge



Management of sexually transmitted infections

MANAGEMENT BASIS

India: NACO, MoHFW — National Technical Guidelines on STI and RTI — 2024 · International: WHO — Guidelines for symptomatic STIs — 2021; CDC — STI Treatment Guidelines — 2021

- Syndromic management is the cornerstone of STI/RTI care in India.
- Designated STI/RTI Clinics (DSRC) provide counselling, colour-coded kits 1 to 7, condoms, and referral to ICTC for HIV and syphilis screening.
- Kit-8 (brown) was added for anorectal discharge.

Table 1: NACO syndromic kits (India) and CDC differences

Kit	Drugs	Covers
1 (grey)	Azithromycin 1000 mg + cefixime 800 mg, single dose	Urethral discharge, cervicitis, painful scrotal swelling
2 (green)	Secnidazole 2000 mg + fluconazole 150 mg, single dose	Vaginitis
3 (white)	Benzathine penicillin G 2.4 MU injection	Syphilis
CDC 2021	Ceftriaxone IM alone for gonorrhoea; doxycycline for chlamydia	Gonorrhoea, chlamydia

- Early syphilis (under 1 year): benzathine penicillin G 2.4 million units, single dose.
- Other points:
 - Rule out other STIs, because they may be transmitted together.

- Ulcerative STIs raise HIV transmission about 10 times. Discharge-type STIs raise it 4–5 times. This is why HIV and syphilis screening and partner treatment matter.
- Lymphogranuloma venereum: doxycycline 100 mg BD or erythromycin base 500 mg QDS for 21 days. Aspirate buboes.
- Counsel on condoms and treat partners.

PEARLS

- Syndromic management treats the syndrome without waiting for the laboratory.
- Kit 2 (green) covers vaginitis; Kit 1 (grey) covers cervicitis and urethral discharge.
- Brown Kit-8 covers anorectal discharge.
- Always offer HIV and syphilis screening at ICTC.
- Exam trap: India uses azithromycin plus cefixime, while CDC uses ceftriaxone monotherapy.

Web sources: [W1] NACO, MoHFW — National Technical Guidelines on STI and RTI — 2024 —

<https://naco.mohfw.gov.in/division/sti-rti-services/> · [W2] WHO — Guidelines for the management of symptomatic sexually transmitted infections — 2021 — <https://www.who.int/publications/i/item/9789240024168> · [W3] CDC — Sexually Transmitted Infections Treatment Guidelines — 2021 — <https://www.cdc.gov/mmwr/volumes/70/rr/rr7004a1.htm>

PART 34

ENT (Otorhinolaryngology)

175. Acute otitis media / ear pain in a young child – causes, signs, management, delayed antibiotics

ASKED 2* · 10-mark answer

Asked in: Aug 2021 · Paper III · Q9 (10 marks) · Apr 2023 · Paper III · Q7 (10 marks)

Q (Aug 2021 · Paper III · Q9): Discuss the clinical features and management of acute otitis media in a 10 month old otherwise healthy child. Outline the role of delayed antibiotic therapy in this condition. [10]

Q (Apr 2023 · Paper III · Q7): A 4-year-old-girl is brought to you by her parents as she has been crying continuously and rubbing her left ear. a) What are the likely causes? [2] b) What physical signs will be seen in different conditions and how will you manage each one of them? [8]

SOURCE DHI — Acute suppurative otitis media; Recurrent AOM; OME; Complications; Conductive hearing loss; Acute tonsillitis — pp. 196, 323, 327–328, 334, 378, 380, 1029

1. Acute otitis media in a 10-month-old: clinical features and management

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflow for the Management of Otorrhoea — 2024 · International: NICE — Otitis media (acute): antimicrobial prescribing (NG91) — 2018, updated 2022; AAP/AAFP — The Diagnosis and Management of Acute Otitis Media — 2013

Clinical features

- **Context:** the child usually has a recent URI. The child is inconsolable, cries and tugs at the ear.
- **Resolving AOM:** the pain is relieved when mucopurulent, blood-stained **otorrhoea** appears.
- **Otoscopy (AAP, children 6 months–12 years):** moderate to severe **bulging of the tympanic membrane (TM)**, or new otorrhoea not due to otitis externa.
- **Milder AAP criteria:** mild bulging with ear pain of onset under 48 hours, or intense TM erythema.
- **Effusion:** do not diagnose AOM without middle-ear effusion (Grade B, Recommendation).
- **Complications to look for:** persistent or recurrent fever and pain, profuse discharge, and mastoid tenderness suggest mastoiditis.

MANAGEMENT BASIS

India: ICMR — STW for the Management of Otorrhoea — 2024 (STW file ID 1725952350, ENT) · International: NICE — Otitis media (acute): antimicrobial prescribing (NG91) — 2018, updated 2022

Management

MANAGEMENT BASIS

India: ICMR — Standard Treatment Workflow for the Management of Otorrhoea · International: NICE — Otitis media (acute): antimicrobial prescribing (NG91) — 2018, updated 2022

- **Analgesia:** give regular **paracetamol or ibuprofen**, at maximum doses for severe pain. Dry local heat also helps.
- **Ear toilet:** if there is discharge, dry-mop with sterile cotton buds. A wick moistened with antibiotic solution may be inserted.
- **Antibiotics:** most children need no antibiotic or only a back-up prescription.
- **Immediate antibiotic is considered when:**
 - AOM is bilateral in a child under 2 years (this child is 10 months old).
 - AOM comes with otorrhoea.
 - The child is systemically very unwell or at high risk of complications.
- **First choice:** oral **amoxicillin 125 mg three times a day for 5–7 days** (age 1–11 months).
- **Penicillin allergy:** clarithromycin, 7.5 mg/kg twice a day for 5–7 days, for age 1 month–11 years and under 8 kg.
- **Myringotomy** is indicated when:
 - the drum is bulging and the pain is acute;
 - resolution is incomplete despite antibiotics;
 - effusion persists beyond 12 weeks.
- **Follow-up:** review until the TM returns to normal appearance.
- **Primary-level prevention (STW):** ensure immunisation (measles, H. influenzae, pneumococcus) in recurrent AOM. Teach correct breastfeeding posture and avoid bottle feeding.
- **Recurrent AOM:** four episodes in 6 months or six in 1 year warrants a tympanostomy tube.

REFER WHEN

- Severe systemic infection.
- Complications such as mastoiditis.

Role of delayed (back-up) antibiotic therapy

- **Principle:** the prescription is issued but not started at once. The parents are told when to use it.
- **Use it if:**
 - symptoms worsen significantly;
 - there is no improvement within **3 days**;
 - symptoms worsen rapidly at any time.
- **Rationale:** most AOM settles with analgesia alone, so this limits unnecessary antibiotic use.
- **Not suitable (give immediate antibiotic):**
 - bilateral AOM under 2 years;
 - AOM with otorrhoea;
 - a systemically unwell child or one at high risk of complications.
- **Safety net:** explain the red flags to the parents. Arrange review if the child is not improving.

2. Likely causes of a crying 4-year-old rubbing the left ear

- **Acute otitis media**, which may be resolving with otorrhoea.
- **Otitis externa or furuncle** of the meatus.
- **Otomycosis.**
- **Canal obstruction** by wax or a foreign body.
- **Otitis media with effusion:** mild earache with hearing loss, in children aged 5–8 years.
- **Acute mastoiditis**, as a complication of AOM.

- Referred pain from acute tonsillitis.

3. Physical signs and management of each condition

MANAGEMENT BASIS

India: ICMR — STW for the Management of Otorrhoea — 2024 · International: NICE NG91; AAO-HNSF Acute Otitis Externa (2014); AAO-HNSF Earwax (2017)

Table 1: Signs and management by cause

Condition	Physical signs	Management
AOM	Bulging, red TM with effusion, or new otorrhoea	Paracetamol or ibuprofen; no or back-up antibiotic; immediate amoxicillin if otorrhoea
Otitis externa / furuncle	Painful pinna movement; tragal pressure painful; swelling of cartilaginous meatus only; non-mucoid discharge; pre- or postauricular nodes	ICMR: oral ciprofloxacin or amoxicillin-clavulanate for 7–10 days plus analgesics. Pack the canal with ichthammol glycerine 1:9 in moderate to severe oedema; refer a pus-pointing furuncle to the district hospital. Topical therapy is first-line in international guidance; oral antibiotics only for cellulitis outside the canal or host factors
Otomycosis	Fungal debris in the canal	Cleaning and clotrimazole ear drops
Wax / foreign body	Canal obstruction; hearing loss about 30 dB if complete	Cerumenolytic, irrigation or manual removal
OME	Dull, opaque, retracted TM; fluid level or bubbles	Follow-up; myringotomy if effusion persists beyond 12 weeks
Acute mastoiditis	Mastoid tenderness; sagging of posterosuperior meatal wall; pulsatile discharge; small perforation	Refer to hospital; send ear swab for culture and sensitivity
Tonsillitis (referred pain)	Red, swollen tonsils with exudate; tender jugulodigastric nodes	Treat the throat cause

- **Distinguishing furuncle from mastoiditis:** the meatal discharge in furunculosis is never mucoid, because the external ear has no mucus-secreting glands.
- **Counselling:** avoid indigenous ear remedies such as oil, hot water or acid.

PEARLS

- AOM diagnosis needs middle-ear effusion plus a bulging TM or new otorrhoea.
- Back-up prescription trigger: no improvement in 3 days or rapid worsening.
- Drug of choice: amoxicillin 125 mg three times a day for 5–7 days at 1–11 months.
- Bilateral AOM under 2 years, or AOM with otorrhoea, means an immediate antibiotic.
- Mucoid discharge means a middle-ear source; it never comes from furunculosis.
- Persistent pain or fever despite antibiotics, or discharge beyond 3 weeks, points to mastoiditis.

Web sources: [W1] ICMR — STW for the Management of Otorrhoea — https://www.icmr.gov.in/icmrobject/uploads/STWs/1725952350_ent_otorrhoea.pdf · [W2] NICE — Otitis media (acute): antimicrobial prescribing (NG91) — 2018, updated 2022 — <https://www.nice.org.uk/guidance/ng91/chapter/recommendations> · [W3] AAP/AAFP — The Diagnosis and Management of Acute Otitis Media — 2013 — <https://publications.aap.org/pediatrics/article/131/3/e964/30912/The-Diagnosis-and-Management-of-Acute-Otitis-Media> · [W4] AAFP — Acute Otitis Externa: Rapid Evidence Review — 2023 — <https://www.aafp.org/afp/2023/0200/acute-otitis-externa> · [W5] AAO-HNSF — Clinical Practice Guideline (Update): Earwax (Cerumen Impaction) — 2017 — <https://pubmed.ncbi.nlm.nih.gov/28045591/>

PART 35

Obstetrics

176. Thyroid disorders in pregnancy & postpartum; neonatal TSH screening

ASKED 1* · 10-mark answer

Asked in: Dec 2025 · Paper III · Q3 (10 marks)

Q (Dec 2025 · Paper III · Q3): A P2L2 mother delivered, normal vaginally, 10 months ago. She has gained weight and has irregular periods postpartum. a) Write briefly on thyroid disorders during pregnancy and postpartum. [7] b) What is the role of neonatal TSH screening? [3]

SOURCE DCO — Ch. 6 Endocrinology in Relation to Reproduction — p. 60 · DCO — Ch. 20 Medical and Surgical Illnesses Complicating Pregnancy (Thyroid dysfunction) — pp. 273–275

Thyroid disorders in pregnancy and postpartum

Physiology that matters

- hCG has a thyrotrophic effect. Total T3 and T4 rise in pregnancy, but free T3 and T4 are unchanged and maternal TSH stays normal.
- The fetus depends on maternal T4 for neurological development until its own thyroid starts working after 12 weeks. TSH crosses the placenta only minimally.
- Daily iodine requirement rises to 200 µg/day (WHO).

Hyperthyroidism (about 2 per 1,000 pregnancies)

- **Causes:**
 - Immunological: Graves' disease, chronic thyroiditis.
 - Non-immunological: nodular disease, subacute thyroiditis.
 - Gestational: hyperemesis, multiple pregnancy, trophoblastic disease.
 - Iatrogenic: excess levothyroxine.
- **Gestational hyperthyroidism:**
 - Due to high hCG in the first trimester.
 - FT4/TT4 are raised and TSH is often suppressed.
 - Often asymptomatic; resolves by 14–20 weeks; antithyroid drugs are not needed.
- **Untreated, the risks are:**
 - Maternal: miscarriage, preterm delivery, pre-eclampsia, CCF, abruption, thyroid storm.
 - Fetal/neonatal: LBW, FGR, stillbirth, neonatal thyrotoxicosis from crossing thyroid-stimulating antibodies.
- **Diagnosis (Graves'):**
 - TSH suppressed with high FT4/FT3/TT4.
 - TPO antibodies and thyroid-stimulating immunoglobulin are measured.
 - Radioactive iodine uptake and scan are not done in pregnancy.

Hypothyroidism (1–2 per 100 pregnancies)

- **Causes:** autoimmune (Hashimoto), post-thyroidectomy, post-radioiodine, and drugs (lithium, amiodarone, iodine excess, antithyroid drugs).
- **Definitions:**
 - Subclinical: raised TSH with normal trimester-specific FT4.
 - Overt: raised TSH with low T4, or TSH >10 mIU/L irrespective of T4.
 - Upper TSH limit is 2.5 mIU/L in the first trimester and up to 3 mIU/L in the second and third.
- **Indian data:** prevalence in pregnancy is 4.8–12%. TSH ≥10 mIU/L is taken as overt hypothyroidism irrespective of FT4.
- **Complications:** pre-eclampsia, abruption, cardiac dysfunction, anaemia, LBW, stillbirth, miscarriage, and impaired intellectual development of the child.

- **Who to test:**

- Age >30 years, iodine-deficient area, symptoms, family history, BMI ≥ 30 , goitre, type 1 DM or other autoimmune disease, unexplained miscarriage or infertility.
- In India, routine screening is recommended (FOGSI, ITS, ESI).

Management

MANAGEMENT BASIS

India: MoHFW — National Guidelines for Screening of Hypothyroidism during Pregnancy — 2014 · International: ATA — Guidelines for Thyroid Disease in Preconception, Pregnancy and Postpartum — 2026; DCO 10e, ch. 20 for drug doses

Table 1: Drug treatment in pregnancy

Condition	Drug and dose	Points
Hyperthyroidism	Propylthiouracil 300–450 mg/day, then maintenance 50–150 mg/day	Preferred in the first trimester
Hyperthyroidism	Carbimazole 10–40 mg/day, then maintenance 5–15 mg	Methimazole embryopathy (choanal and oesophageal atresia, TEF, omphalocele)
Tachycardia/arrhythmia	Propranolol	Add-on
Hypothyroidism	Levothyroxine 2–2.4 µg/kg/day, maintenance 75–150 µg	Check TSH every 4–6 weeks

- **Hyperthyroidism:**

- Both antithyroid drugs can cause fetal goitre and hypothyroidism.
- Fetal surveillance is by serial USG, NST and BPP; fetal tachycardia >160 bpm, FGR, oligohydramnios or goitre suggests fetal hyperthyroidism.
- Thyroidectomy is possible in the second trimester after biochemical control.
- Breastfeeding is allowed on a low drug dose. Take cord blood for TSH and FT4 at delivery.

- **Hypothyroidism:**

- The aim is to be euthyroid at conception.
- Increase the levothyroxine dose in the second trimester, and in women already on levothyroxine before pregnancy. Reduce the dose after delivery.

- **Thyroid storm** (mortality about 25%):

- Features: temperature >103°F, heart rate >140/min, CCF, neuropsychiatric symptoms.
- Treat in ICU with fluids, oxygen and paracetamol.
- Give propranolol, PTU or methimazole, Lugol's iodine and hydrocortisone.

Postpartum thyroid disorders

- **Postpartum thyroiditis:**

- An autoimmune disease seen in the first year postpartum.
- A transient hyperthyroid phase is usual; about two-thirds become euthyroid and one-third become hypothyroid.
- Treatment is symptomatic (β -blockers and/or levothyroxine).

- **Testing:** thyroid function should be checked in the first 6–12 months postpartum, especially in TPOAb-positive women or those on levothyroxine.

- **This patient (10 months postpartum, weight gain, irregular periods):** this suggests hypothyroidism, so check TSH and FT4. Follow up TPOAb-positive women.

Role of neonatal TSH screening

- **Purpose:** to detect congenital hypothyroidism before symptoms appear. Early levothyroxine prevents intellectual disability. The fetus depends on maternal T4 until its own thyroid works.
- **Who and when:** screen every newborn, using cord blood or postnatal blood, ideally at 48–72 h of age.
- **Interpretation:**

- Recall for confirmation if screen TSH is >20 mIU/L (>34 mIU/L if sampled at 24–48 h).
- If screen TSH is >40 mIU/L, do an immediate venous T4/FT4 and TSH.
- **Confirmation of primary congenital hypothyroidism:** venous TSH >20 mIU/L before 2 weeks (>10 mIU/L after 2 weeks) with low T4 (<10 µg/dL) or low FT4 (<1.17 ng/dL).
- **Treatment:** levothyroxine 10–15 µg/kg in the neonatal period.
- **Relevance to this mother:** maternal thyroid disease and antithyroid drugs can affect fetal thyroid function.

PEARLS

- Pregnancy TSH upper limits: 2.5 mIU/L in the first trimester and up to 3 mIU/L later. TSH >10 mIU/L is overt hypothyroidism regardless of FT4.
- Gestational hyperthyroidism is due to hCG and resolves by 14–20 weeks, so it needs no antithyroid drug.
- Avoid methimazole in the first trimester (embryopathy) and never give radioiodine in pregnancy.
- Levothyroxine in pregnancy: start at 2–2.4 µg/kg/day, check TSH every 4–6 weeks, and raise the dose in the second trimester.
- Postpartum thyroiditis is a hyperthyroid phase followed by a hypothyroid phase in the first year.
- Neonatal screening is at 48–72 h. A screen TSH >20 mIU/L means recall, and >40 mIU/L means immediate confirmation.

Web sources: [W1] MoHFW (Maternal Health Division) — National Guidelines for Screening of Hypothyroidism during Pregnancy — 2014 — https://nhm.gov.in/images/pdf/programmes/maternal-health/guidelines/National_Guidelines_for_Screening_of_Hypothyroidism_during_Pregnancy.pdf · [W2] ISPAE — Newborn Screening Guidelines for Congenital Hypothyroidism in India — 2018 — <https://pubmed.ncbi.nlm.nih.gov/29380252/> · [W3] ATA — Guidelines for Thyroid Disease in Preconception, Pregnancy, and Postpartum — 2026 — <https://pubmed.ncbi.nlm.nih.gov/42219800/>

177. Antenatal care – investigations, visits, advice, high-risk factors

ASKED 5* · 10-mark answer

Asked in: Dec 2022 · Paper III · Q9(a,b) (5 marks) · Apr 2023 · Paper III · Q4(a,b) (5 marks) · Oct 2023 · Paper III · Q1 (10 marks) · Jun 2025 · Paper III · Q4 (10 marks) · Dec 2025 · Paper III · Q2(a) (2 marks)

Q (Dec 2022 · Paper III · Q9(a,b)): Mrs. Rubina G3P2L1IUD presented at 24 weeks of gestational age for follow up. Her Glucose tolerance test results were as follows: 106, 194 and 176mg% at fasting, 1 hour and 2 hours respectively. She gives history of having gestational diabetes toward the later part in previous pregnancy and was on medical nutrition therapy: a) What is a high risk pregnancy? [2] b) What other relevant history and risk factors you will explore? [3]

Q (Apr 2023 · Paper III · Q4(a,b)): A 24-year-old primi gravida comes to you for antenatal check up in the 3rd month. a) What tests will you do? [2] b) What advice will you provide for good pregnancy outcome? [3] At 30th week, she presented with pedal edema and her BP is 140/90 mmHg. [3]

Q (Oct 2023 · Paper III · Q1): A 35-year-old female high school teacher, who is overweight, consults you at 12 weeks of gestation. Her both parents are diabetic: a) How will you proceed? [2] b) What all investigations you will advise throughout her ANC? [3] c) What are the recommended minimum number of visits for low-risk pregnancy and at what gestation age? [2] d) What all conditions will lead to high-risk pregnancy? [3]

Q (Jun 2025 · Paper III · Q4): A 23-year-old G3P1L1 SB1 at 36 weeks of gestational age with previous spontaneous preterm birth at 34 weeks with previous small for gestational age has come for ANC follow-up. a) What are the risk factors for preterm birth? [3] b) Which are the factors classify a pregnancy as a high-risk pregnancy? [3] c) What are the routine investigations and recommended visits included in antenatal care in a low-risk and high-risk pregnancy? [4]

Q (Dec 2025 · Paper III · Q2(a)): A 35-year-old lady G2P1L1 at 14 weeks of gestation comes for her antenatal care. She is worried, since she had PIH (Pregnancy induced hypertension) in her previous pregnancy. a) What are high-risk pregnancies? [2]

SOURCE DCO — Ch. 10 Antenatal Care, Preconceptional Counseling and Care — pp. 86–87, 89–91, 93–94

1. What is a high-risk pregnancy? (also Dec 2025 Q2a)

- A **high-risk pregnancy (HRP)** is one in which the mother, fetus or newborn has a higher chance of morbidity or death than usual. It is identified from obstetric or medical history and existing clinical conditions.
- About **20–30%** of pregnancies are high risk, and these account for about **75%** of perinatal morbidity and mortality in India.

- Under PMSMA, an HRP gets a **red sticker** on the MCP card and a **green sticker** if no risk is found.
- DCO states that risk assessment is a continuing process, not a one-time exercise.
- Detecting a risk factor earns no credit unless the woman is admitted, investigated or treated.
- The Government of India list now has **25 categories**, up from 10. They include HIV, syphilis, severe anaemia, PIH, GDM and hypothyroidism.

2. Conditions and factors that make a pregnancy high risk (Oct 2023 Q1d; Jun 2025 Q4b)

Table 1: Factors that classify a pregnancy as high risk

Group	Examples
Age and social	Extremes of age; elderly primigravida (first pregnancy at ≥ 35 years, FIGO); low social status
Medical	Cardiac or pulmonary disease; hypertension; diabetes; HIV, syphilis, severe anaemia, hypothyroidism
Past obstetric	Previous preterm labour; bad obstetric history; previous LSCS (listed as a PMSMA criterion)
Present pregnancy	PIH or GDM; vaginal bleeding (APH); fetal growth restriction; multiple pregnancy
Lifestyle	Smoking (smaller babies, more abortion)

- Anaemia, pre-eclampsia and preterm labour are more common with low social status.

3. Further history and risk factors to explore (Dec 2022 Q9b)

Case: G3P2L1IUD at 24 weeks. Fasting 106, 1-hour 194, 2-hour 176 mg/dL. GDM in the previous pregnancy.

- **Interpretation:** the MoHFW cut-off is a 2-hour value ≥ 140 mg/dL on a 75 g OGTT, so this is **GDM**. ADA cut-offs are 92/180/153 mg/dL, and all three values here exceed them.
- **Previous GDM:** gestation at diagnosis, MNT alone or insulin, birth weight and macrosomia, mode of delivery, neonatal hypoglycaemia. Also whether glucose was checked after that delivery.
- **Intrauterine death:** cause, gestation, any anomaly or macrosomia, and whether antenatal and intranatal care were received. Record G, P, A and living issue.
- **Interval since last birth:** the minimum spacing should be 2 years.
- **Family history:** diabetes, hypertension.
- **Present pregnancy:** booking status, immunisation, drugs or radiation exposure, features of UTI, anaemia, pre-eclampsia or APH.
- **Other risk factors:** age, pre-pregnancy BMI and weight gain, hypertension, thyroid disease, smoking, alcohol.

4. Tests at the first (3-month) visit (Apr 2023 Q4a)

- **Blood:** haemoglobin, haematocrit, ABO and Rh grouping, haemoglobinopathies, blood glucose, VDRL.
- **Urine:** protein, sugar and pus cells. Send a clean-catch midstream culture if there is significant proteinuria.
- **Serology:** rubella immunity, hepatitis B and HIV (with consent).
- **Pap smear or LBC,** unless done before.
- **Ultrasound:** dating, number of fetuses and gross anomalies. A dating scan before 12 weeks is advised.

5. Advice for a good outcome (Apr 2023 Q4b)

- **Diet:** adequate, of the woman's choice, with about 300 kcal extra in the second half.
 - A woman with normal BMI should aim for about 11 kg weight gain.
- **Iron:** one tablet of ferrous sulphate containing 60 mg elemental iron from **16 weeks** if Hb is above 10 g%. Give 2–3 tablets a day if Hb is lower.
- **Tetanus toxoid:** 0.5 mL IM, 2 doses 6 weeks apart, the first between 16 and 24 weeks. A booster is given if she was immunised before.
- **Activity and exercise:** she may continue usual activity. Avoid strenuous work in the first trimester and the last 4 weeks. Low-impact exercise for 30 min/day is allowed.



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HOW TO USE

Each answer groups every year and paper in which the question was asked ("Asked in") and answers the union of the parts asked. The badge shows how often it was asked. The SOURCE line under the questions names the book chapters and pages and the guideline documents used. Amber MANAGEMENT BASIS strips name the Government of India document first, then the international one. Slate boxes give Murtagh's safe diagnostic strategy with the Indian layer; teal boxes say when to refer; green boxes are exam pearls. A lists the parts, B this volume question by question, C the high-yield list (asked 3× or more).

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PART 39

General Medicine – Cardiology

239. ACS golden hour; antiplatelet & statin guidelines

ASKED 1* · 10-mark answer

Asked in: Dec 2025 · Paper IV · Q3 (10 marks)

Q (Dec 2025 · Paper IV · Q3): A 45-year-old gentleman developed recently an ACS. He was on treatment for diabetes mellitus and hypertension. a) What is golden hour in ACS? [2] b) What is the role of the primary care provider in golden hour? [3] c) What are the recent guidelines on the usage of antiplatelets and statins in the prevention and treatment of major cardiovascular events? [5]

SOURCE MUR — Chest pain (ACS, first-line management); angina treatment — pp. 359, 372, 375 · HAR — ch. 285
Non-ST-Segment Elevation ACS — pp. 2110, 2112

1. Golden hour in ACS

- **Golden hour** is the first 60 minutes from onset of chest pain in STEMI. The aim is urgent referral to a coronary catheter laboratory within this time for primary angioplasty (PTCA) with stenting.
- Reperfusion targets from symptom onset:
 - PCI within 60 min is optimal.
 - PCI within 90 min is acceptable.
 - If these are missed, give fibrinolysis within 30 min of arrival.
- India (ICMR STEMI workflow): transfer to a PCI-capable hospital if PCI can be done within 120 min.
- A diabetic, hypertensive patient is more likely to have an atypical or silent MI. This makes early recognition harder.

2. Role of the primary care provider in the golden hour

- Treat chest pain as an acute coronary event until proved otherwise. Get a 12-lead ECG rapidly.
- **First-line actions** (outside hospital):
 - Do an ECG and classify the ACS as STEMI or NSTEMI. The ECG is the sole test needed to select patients for emergency reperfusion.
 - Notify the receiving facility, by telephone if possible.
 - Give oxygen at 4–6 L/min only if hypoxaemic, aiming for $\text{PaO}_2 > 90\%$.
 - Secure an IV line and draw blood for troponin.
 - Give glyceryl trinitrate 300 mcg SL, or spray 400 mcg, every 5 min to a maximum of three doses. Beware recent sildenafil-type drug use, and bradycardia (correct with atropine).
 - Give **aspirin 300 mg** (chewed or dissolved sublingually) as early as possible if there are no contraindications.
 - Give morphine 2.5–5 mg IV bolus, then 1 mg/min every 5–10 min until pain relief (up to 15 mg).
 - Start a beta blocker and an ACE inhibitor early if there are no contraindications.
- Provide empathy and reassurance.
- **Arrange transfer without delay.** Do not wait for troponin results.
 - The decision between PCI and fibrinolysis depends on PCI availability.
 - Where PCI is not possible in time, fibrinolysis is indicated, preferably within 12 h of pain onset.
 - Under the ICMR workflow, send the patient to a PCI-capable hospital if PCI can be done within 120 min.
- Do not use sublingual or IV nitrates in patients who have recently taken a phosphodiesterase inhibitor.

REFER WHEN

- Every suspected ACS needs urgent hospital transfer, ideally with an escort and ECG monitoring.
- STEMI: refer to a cath lab, or for fibrinolysis if PCI is not achievable in time.
- NSTEMI: admit, because it can progress to STEMI and needs monitoring and risk stratification.

3. Recent guidelines on antiplatelets and statins

Antiplatelets

Table 1: Antiplatelet regimens in ACS (India · International)

Drug	India (ICMR STEMI workflow)	International (Harrison; ACC/AHA 2025)
Aspirin	—	Load 150–325 mg, then 75–100 mg/day
Clopidogrel	—	Load 600 mg (PCI planned) or 300 mg, then 75 mg/day
Prasugrel	Load 60 mg, then 10 mg OD	Same dose; 5 mg/day if <60 kg or >75 years; avoid with prior stroke/TIA
Ticagrelor	Load 180 mg, then 90 mg BD	Same dose; reduce to 60 mg BD 1 year after ACS

- **DAPT** (aspirin plus a P2Y₁₂ inhibitor) is the standard in ACS.
 - Prasugrel or ticagrelor is preferred over clopidogrel when PCI is done.
 - Duration is at least 12 months unless bleeding risk is high.
 - Harrison: after 12 months, continue a single antiplatelet.
- High bleeding risk, no anticoagulant: DAPT for 3–6 months, then P2Y₁₂ inhibitor alone. Do not de-escalate in the first 30 days.
- Patients on long-term anticoagulation (e.g. AF): stop aspirin at discharge or 1 week. Continue oral anticoagulant plus clopidogrel to month 12, then anticoagulant alone.
- High ischaemic risk with low bleeding risk (prior MI, diabetes, heart failure): DAPT for up to 3 years may help.
- Anticoagulation in the ICMR workflow: unfractionated heparin bolus 60 U/kg (maximum 5000 U), then 12 U/kg/h to keep APTT at 50–70 s.

Statins and lipid lowering

Table 2: Lipid-lowering therapy in ACS (India · International)

Point	India (ICMR)	International
Statin	Atorvastatin 80 mg OD or rosuvastatin 20–40 mg OD	High-intensity statin for all ACS patients, with ezetimibe as an option from the start. Harrison: atorvastatin 80 mg/day or rosuvastatin 40 mg/day, started early before PCI
Add-on	—	Add non-statin drugs if LDL-C stays above 70 mg/dL on maximum statin
Target	—	Harrison: LDL-C <55 mg/dL

- If LDL-C falls by <50% on maximally tolerated statin, add ezetimibe 10 mg daily and/or a PCSK9 inhibitor.
- Other long-term drugs:
 - beta blockers
 - ACE inhibitor or ARB
 - SGLT2 inhibitor or GLP-1 receptor agonist in selected type 2 diabetes
- ICMR: ramipril 2.5–10 mg OD or enalapril 2.5–10 mg BD. Give an oral beta-blocker if LVEF is <40%.
- Risk factor control (smoking cessation, BP, glycaemia) is emphasised at discharge, a "teachable moment".

PEARLS

- Golden hour: first 60 min of STEMI pain, with a cath lab target of PCI within 60 min.
- ECG is the sole test needed to select patients for emergency reperfusion.
- Aspirin 300 mg chewed is the first drug in primary care; give oxygen only if hypoxaemic.
- ICMR: prasugrel 60 mg load then 10 mg, or ticagrelor 180 mg load then 90 mg BD, with DAPT for at least 1 year.
- High-intensity statin (atorvastatin 80 mg) for all ACS; LDL-C target <55 mg/dL.
- Trap: prasugrel is contraindicated with prior stroke/TIA. Avoid nitrates after recent sildenafil-type drugs.

Web sources: [W1] ICMR — Standard Treatment Workflow: ST Elevation Myocardial Infarction (STEMI) — https://www.icmr.gov.in/icmrobject/uploads/STWs/1768823342_cardiology_1-5.pdf · [W2] ACC/AHA/ACEP/NAEMSP/SCAI — 2025 Guideline for the Management of Patients With Acute Coronary Syndromes — 2025 — <https://www.ahajournals.org/doi/10.1161/CIR.0000000000001309>

240. Factors affecting control of primary hypertension

ASKED 1* · 4–5–mark answer

Asked in: Jun 2025 · Paper IV · Q4(a) (4 marks)

Q (Jun 2025 · Paper IV · Q4(a)): You are having many patients with hypertension taking treatment in your family practice. Only 50% of them are controlled with medications. Rest of them are uncontrolled even after taking regular medications. You want to study whether drug A or drug B is effective for hypertension in your population. a) What are the factors affecting the control of hypertension in an adult with primary hypertension? [4]

SOURCE HAR — Ch. 288 Hypertension — pp. 2148–2149 · MUR — Part Five, Hypertension — pp. 914–915

Factors affecting control of hypertension in adults with primary hypertension

Patient-related factors

- **Non-adherence** to drugs, lifestyle advice and follow-up is the commonest cause of apparent "uncontrolled" BP. Reasons include cost, polypharmacy and symptom-free disease. The India Hypertension Control Initiative (IHCI) addresses this with free drugs, a fixed-dose stepped protocol and 30-day review.
- **Lifestyle factors:** excess dietary sodium, obesity, physical inactivity and excess alcohol. Excess alcohol can cause hypertension and make treatment difficult. Alcohol and recreational drugs are also listed among the factors that give spurious or poor control.
- **Interfering drugs:** NSAIDs and similar drugs interact with antihypertensives in older patients.
- **Age and comorbidity:** in older adults comorbidity is common, and drug-drug interactions and delayed drug excretion in kidney or liver disease are possible.
 - Treatment may need lower starting doses, and some patients need triple therapy.
- **Sex-related effects:** women report more ACE inhibitor cough and CCB pedal oedema, which can lead them to stop treatment. ACEIs and ARBs must be avoided in pregnancy or when pregnancy is planned.
- **Socioeconomic and social determinants:** education, access to care, neighbourhood, economic instability and community context explain much of the gap in control between groups.

Measurement and diagnostic factors

- **Spurious factors:** a small cuff and "white coat" hypertension give false readings. Home or 24-hour ambulatory BP monitoring is useful.
- **Diagnosis on a single reading:** hypertension should not be diagnosed on one reading, and at least two follow-up measurements are needed.
- **Home BP monitoring:** it engages the patient in their own care and helps long-term monitoring. It needs clinically valid devices and training.

Treatment-related factors

MANAGEMENT BASIS

India: NP-NCD / ICMR-NIE — India Hypertension Control Initiative drug- and dose-specific protocol and training modules — state-adapted protocols

- **Inadequate or inappropriate regimen:** drugs may be poorly matched to comorbidity (see MUR Table 76.9).
 - Beta blockers should be avoided in patients with wheeze.
 - Dose adjustment should happen about every 4 weeks. Clinical inertia, meaning delayed titration, prevents control.
- **Adverse effects and intolerance** lead to stopping drugs. Diuretics may aggravate incontinence in the elderly.
- **Secondary or resistant causes:**
 - Primary aldosteronism is a common cause of refractory hypertension. Its diagnosis needs the aldosterone-to-renin ratio.
 - A missed kidney or adrenal lesion should be suspected if there is no response to therapy.
 - Renovascular disease is common in hypertensive emergency.

Health-system factors

- **Overburdened primary care:** physicians have very limited time for routine uncomplicated hypertension. The traditional one-on-one model has failed to achieve control.
- **Absent team-based care:** this gave the largest gains in RCTs, with an average SBP fall of ~7 mmHg. Nonphysician professionals with authority to prescribe, under oversight, are especially effective.
- **Access to effective, affordable medication and information systems** to track progress and manage cases.
- **Global control is poor:** BP is controlled to <140/90 mmHg in <14% of adults worldwide and <8% in low- and middle-income countries.

Table 1: Grouping of factors affecting control

Domain	Key examples
Patient	Non-adherence, salt, alcohol, obesity, NSAIDs, age, comorbidity
Measurement	Small cuff, white-coat effect, single reading
Treatment	Wrong drug, low dose, inertia, adverse effects, resistant or secondary cause
System	No team care, drug cost and access, no tracking

PEARLS

- Always exclude **pseudo-resistance** (poor adherence, wrong cuff, white-coat effect) before labelling hypertension resistant.
- **Team-based care** gives the biggest improvement in control in RCTs.
- Add **one agent at a time** and wait ~4 weeks between adjustments.
- **Primary aldosteronism** needs the aldosterone-to-renin ratio, and potassium is low only half the time.
- India's approach: IHCI stepped protocol (amlodipine 5 mg first, telmisartan if CKD) with 30-day review.

Web sources: [W1] NP-NCD / ICMR-NIE — India Hypertension Control Initiative drug- and dose-specific protocol and training modules — state-adapted protocols — <https://pmc.ncbi.nlm.nih.gov/articles/PMC10959138/>

PART 40

General Medicine – Endocrinology, Diabetes & Metabolism

241. Obesity classification, calorie needs & diet plan

ASKED 1* · 10-mark answer

Asked in: Jun 2025 · Paper IV · Q6 (10 marks)

Q (Jun 2025 · Paper IV · Q6): A 55-year-old post-menopausal woman, married for 28 years with two children, has come to you for management of uncontrolled diabetes. Her height is 152 cm, and her weight is 88 kg. She is a housewife with sedentary lifestyle. a) How will you classify obesity and what class she fits in? [2] b) What is the daily calories and proteins requirement to maintain her health? [2] c) Write a diet sheet for the patient mentioned above to control her diabetes as well as for weight loss. [3] d) What health promotions and preventions you suggest for her as her personal physician? [3]

SOURCE HAR — Ch. 414 Evaluation and Management of Obesity — pp. 3187, 3188, 3190, 3192

Classification of obesity and her class

- **BMI** = weight (kg)/height (m)². Waist circumference is the second measure. It is a surrogate for visceral fat, taken in the horizontal plane above the iliac crest.

Table 1: WHO classification of weight status and disease risk

Classification	BMI (kg/m ²)	Class	Disease risk
Underweight	<18.5	—	—
Healthy weight	18.5–24.9	—	—
Overweight	25.0–29.9	—	Increased
Obesity	30.0–34.9	I	High
Obesity	35.0–39.9	II	Very high
Extreme obesity	≥40	III	Extremely high

TABLE 414-1 Classification of Weight Status and Disease Risk

CLASSIFICATION	BODY MASS INDEX (kg/m ²)	OBESITY CLASS	DISEASE RISK
Underweight	<18.5	—	—
Healthy weight	18.5–24.9	—	—
Overweight	25.0–29.9	—	Increased
Obesity	30.0–34.9	I	High
Obesity	35.0–39.9	II	Very high
Extreme obesity	≥40	III	Extremely high

Source: Reproduced with permission from WHO Consultation on Obesity (1997): Geneva, Switzerland), World Health Organization; 1997.

TABLE 414-1 — reproduced from Harrison's 22e, p. 3188.

- Source of Table 1: WHO 1997 as reproduced in.
- **Asian-Indian consensus:** overweight is BMI 23–24.9 kg/m² and obesity is ≥25 kg/m². Abdominal obesity is a waist ≥80 cm in women and ≥90 cm in men. South Asian women with a waist >80 cm are at risk.
- The Asia-Pacific thresholds are lower because South Asians develop glucose and lipid abnormalities at lower body weights.

WORKED EXAMPLE

1. BMI = $88 \div (1.52 \times 1.52) = 88 \div 2.31 = 38.1 \text{ kg/m}^2$.
2. WHO: 35.0–39.9 means **Class II obesity** (very high risk).
3. Asian-Indian cut-off: she is far above the ≥25 obesity threshold.

Daily calorie and protein requirement

- **Maintenance energy:** the ICMR-NIN 2020 estimated average requirement for a sedentary adult woman is **1660 kcal/day**. There is no RDA for energy.
- **Protein:** the ICMR-NIN adult RDA for women is **45.7 g/day**. This is the reference-woman value, and the protein recommendations for older women are the same as for adults.
- **For weight loss, as she needs:**
 - Start with a deficit of **500–750 kcal/day** below her habitual intake.
 - Alternatively, prescribe **1200–1500 kcal/day** for women. This is the practical prescription for her.
 - Keep protein at or above the RDA (about 46 g/day) so lean mass is preserved.
- **Goal:** a realistic initial target is 8–10% weight loss over 6 months. For her this is about 7–9 kg.
- **Check first:** the STW work-up includes creatinine and urine albumin:creatinine ratio, so confirm kidney function before fixing protein intake.

Diet sheet for diabetes control and weight loss

- **Principle:** weight loss depends mainly on total calorie reduction and adherence, not on the macronutrient ratio. Fit the diet to her taste, cooking style and culture. Involve a nutritionist for medical nutrition therapy.

Table 2: Sample diet sheet (about 1200–1500 kcal/day)

Meal	Content
Early morning	Water or unsweetened tea
Breakfast	Whole-grain cereal or oatmeal-type item, plus vegetables and one low-fat dairy serving
Mid-morning	One fruit
Lunch	Whole-grain roti (small portion), dal or lean protein, a large vegetable portion, salad
Evening	Soup or vegetable snack, with no fried items
Dinner	As lunch, smaller, taken early
Bedtime	Skimmed milk, if needed

- **Foods to prefer:**
 - Whole grains, fruits, vegetables and fibre.
 - Fat-free or low-fat dairy and leaner cuts of meat.
 - Low-energy-dense foods such as soups, fruits, vegetables, oatmeal and lean meats, which control hunger.
- **Foods to restrict:**
 - Fried foods and foods with added fats and oils.
 - Sugar-sweetened beverages, replaced by water.
 - Added sugars and saturated fat should be <10% of daily calories.
 - Sodium should be <2300 mg/day.
- **Portion control:** use smaller portions. Meal replacements are a convenient aid.
- **Goals:** set SMART goals (specific, measurable, agreed upon, realistic, timely).
- **Avoid:** very-low-calorie diets (≤ 800 kcal) outside supervised medical settings.
- **Monitor:** with diabetes drugs such as insulin or sulfonylureas, watch for hypoglycaemia as calories fall. These drugs also cause weight gain.

Health promotion and prevention as her personal physician

Health promotion

- **Counselling:** offer intensive lifestyle counselling with behavioural interventions. Use neutral words such as "weight" or "BMI" rather than "obesity".
- **Physical activity:** advise **60 min of physical activity every day** (Indian consensus). Physical fitness predicts mortality independent of BMI. Exercise alone is only moderately effective, so combine it with diet.
- **Behaviour:** address sleep (duration and regularity) and stress, because both affect weight.
- **Readiness and expectations:** assess her readiness to change, goals and difficulties.
- **Family:** involve her husband and children in the dietary change.

Prevention of complications

- **Glycaemic targets (ICMR STW):** HbA1c $\leq 7.0\%$ (higher if elderly or with comorbidity). Pre-prandial glucose 80–130 mg/dl and post-prandial <180 mg/dl.
- **Other targets (ICMR STW):** BP 140/90 mmHg (130/80 in CKD). LDL <100 mg/dl.
- **Work-up (ICMR STW):** HbA1c, creatinine, K⁺, lipid profile, urine routine and albumin:creatinine ratio, LFT and ECG.
- **Drug treatment (ICMR STW):** metformin alone if HbA1c <8.5%. Metformin plus one more drug if 8.5–10%. Insulin-based or triple therapy if >10%.
- **Weight-gaining drugs:** review them, including insulin, sulfonylureas and thiazolidinediones.
- **Screen for obesity-related disease:**
 - Hypertension, dyslipidaemia and sleep apnoea.

- Fatty liver.
- Knee osteoarthritis and gout.
- Reflux and gallstones.
- **Cancer risk:** obesity raises the risk of endometrial (in women), colorectal, kidney and pancreatic cancer. Counsel her to report postmenopausal bleeding.
- **Escalation of obesity treatment (Table 414-4):** at BMI 35–39.9 with comorbidity, pharmacotherapy and surgery are options.
 - Pharmacotherapy: GLP-1 receptor agonists (liraglutide, semaglutide) and tirzepatide. Avoid them with a personal or family history of medullary thyroid cancer or MEN2.
 - Do this after lifestyle management has been tried.
- **Follow-up:** review her regularly to reinforce the changes and check progress.

PEARLS

- Class II obesity is WHO BMI 35.0–39.9. This patient's BMI is 38.1.
- Asian-Indian cut-offs differ: obesity is BMI ≥ 25 , and waist is ≥ 80 cm in women.
- Adult women: energy EAR 1660 kcal/day when sedentary, protein RDA 45.7 g/day. Weight-loss diet is 1200–1500 kcal/day.
- Initial weight-loss target is 8–10% over 6 months.
- Trap: weight loss depends on calorie deficit and adherence, not on the macronutrient ratio.
- Escalate in order: lifestyle first, then drugs, then surgery (BMI ≥ 35 with comorbidity).

Web sources: [W1] Misra A et al. — Consensus Statement for Diagnosis of Obesity, Abdominal Obesity and the Metabolic Syndrome for Asian Indians — J Assoc Physicians India 2009;57:163–70 — <https://link.springer.com/article/10.1007/s13410-011-0056-9> · [W2] Indian Journal of Medical Research — Nutritional requirements for the elderly in India: A status paper (ICMR-NIN 2020 values) — <https://ijmr.org.in/nutritional-requirements-for-the-elderly-in-india-a-status-paper/> · [W3] ICMR (DHR, MoHFW) — Standard Treatment Workflow, Diabetes Mellitus Type 2 (ICD-10 E11), STW Vol. 3 Endocrinology — 2022 — https://www.icmr.gov.in/icmrobject/uploads/STWs/1726567245_diabetes_mellitus_type_2.pdf

242. Overweight school children – causes, risks, FP role

ASKED 1* · 10-mark answer

Asked in: May 2024 · Paper IV · Q10 (10 marks)

Q (May 2024 · Paper IV · Q10): You conduct a school health screen for 10th graders and identify 30% of the students are overweight: a) What are the causes for more students being overweight in the past decade? [3] b) What are the future health risks for children with overweight and obesity? [3] c) What is your role in health promotion and prevention as family practitioner for this group of students? [4]

SOURCE MUR — Prevention in general practice — pp. 45–49, 53 · HAR — Ch. 414, Evaluation and Management of Obesity — pp. 3187, 3189

1. Causes of the rise in overweight among students in the past decade

- **Energy imbalance from lifestyle:** poor diet and a sedentary lifestyle are listed risk factors for vascular disease and obesity.
- **Trend:** obesity and diabetes are listed among the public-health indices that deteriorated over the two decades examined.
- **Leading risk factors:** excess weight and physical inactivity feature among the leading contributors to disease burden.
- **Food environment in India:**
 - Policy action has targeted high fat, salt and sugar (HFSS) foods in and around schools.
 - Policy has also targeted sugar-sweetened beverages and marketing to children.
 - These targets show where the drivers lie: energy-dense processed food, sugary drinks and advertising aimed at children.
- **Reduced activity:** less time for physical activity in school and daily life. This is a common contributor, but I could not find it stated in the sources provided.
- **Family and genetic factors:** family history is a risk marker to elicit. Genetic variation strongly influences obesity risk in everyone.

- **Secondary causes to exclude:** diabetes and thyroid disorders are listed masquerades.

2. Future health risks of childhood overweight and obesity

TABLE 414-3 Obesity-Related Organ Systems Review

Cardiovascular	Respiratory
Hypertension	Dyspnea
Congestive heart failure	Obstructive sleep apnea
Cor pulmonale	Hypoventilation syndrome
Varicose veins	Pickwickian syndrome
Pulmonary embolism	Asthma
Coronary artery disease	Gastrointestinal
Endocrine	Gastroesophageal reflux disease
Metabolic syndrome	Nonalcoholic fatty liver disease
Type 2 diabetes	Cholelithiasis
Dyslipidemia	Hernias
Polycystic ovarian syndrome	Colon cancer
Musculoskeletal	Genitourinary
Hyperuricemia and gout	Urinary stress incontinence
Immobility	Obesity-related glomerulopathy
Osteoarthritis (knees and hips)	Hypogonadism (male)
Low back pain	Breast and uterine cancer
Carpal tunnel syndrome	Pregnancy complications
Psychological	Neurologic
Depression/low self-esteem	Stroke
Body image disturbance	Idiopathic intracranial hypertension
Social stigmatization	Meralgia paresthetica
Integument	Dementia
Striae distensae	
Stasis pigmentation of legs	
Lymphedema	
Cellulitis	
Intertrigo, carbuncles	
Acanthosis nigricans	
Acrochordons (skin tags)	
Hidradenitis suppurativa	

TABLE 414-3 — reproduced from Harrison's 22e, p. 3189.

Obesity complications are organ-wise. Their number and severity usually rise with the degree of obesity.

Table 1: Obesity-related health risks by system

System	Risk
Metabolic/endocrine	Insulin resistance, impaired glucose tolerance and type 2 diabetes ; metabolic syndrome, dyslipidaemia
Reproductive	PCOS in girls: irregular menses, anovulation, hirsutism; central hypogonadism in males
Cardiovascular	Hypertension, dyslipidaemia, atherothrombotic disease (CAD, stroke), heart failure, atrial fibrillation
Liver/GI	Fatty liver → NASH → fibrosis/cirrhosis; reflux oesophagitis; gallstones
Respiratory	Exertional dyspnoea, sleep apnoea
Musculoskeletal	Knee osteoarthritis, gout; low back pain
Skin	Acanthosis nigricans (marker of insulin resistance), intertrigo, hidradenitis suppurativa
Cancer	Colorectal, kidney, pancreatic, oesophageal adenocarcinoma, endometrial
Neuro/psychological	Idiopathic intracranial hypertension; depression, low self-esteem, body-image disturbance, stigmatisation
Infection	More bacterial wound infections and postoperative sepsis

- **Prognostic point:** an increase in BMI of 5 kg/m² raises cancer mortality by 10%.

3. Role of the family practitioner in health promotion and prevention for these students

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: simple (exogenous) overweight from poor diet and sedentary lifestyle.
- Serious disorders not to be missed: diabetes mellitus and thyroid disorders. Look for acanthosis nigricans and PCOS features as markers of insulin resistance.
- Pitfalls: growth adequacy cannot be judged on one measurement, so use serial recordings on growth charts. Do not apply the adult Asian-Indian cut-offs (BMI ≥25, waist ≥80/90 cm) to children.
- Masquerades: depression, diabetes mellitus, drug problems, hypothyroidism.
- Is the patient trying to tell me something?: ask about coping, relationships and home life. Consider depression, low self-esteem and stigmatisation.
- Indian layer: school screening is already part of the Ayushman Bharat School Health programme, with early detection and referral to PHCs and hospitals.

Screening and individual assessment

- Record height and weight at regular intervals and calculate BMI.
- Plot on serial growth charts, not a single reading.
- Take a family history (cardiovascular disease, diabetes).
- Take a nutrition and exercise history.
- Screen for suicide and accident risk, substance use, and mental health.
- Stage the child by complications, not BMI alone.
- Assess readiness to change. Ask the child and family to rate importance and confidence from 0 to 10 (motivational interviewing "anchoring").

Behaviour modification

- Lifestyle habits built over years are hard to change even in motivated people.
- Use instructional, motivational and behavioural techniques, supported by a multidisciplinary team.
- Key messages: healthy diet, regular exercise, less sugar-sweetened food and drink. Make these family-wide changes.
- Do not set up an attempt at change when the patient is not ready, as it causes frustration.

School and community level (India)

- Support the Ayushman Bharat School Health and Wellness Programme.
 - Two teachers per school act as **Health and Wellness Ambassadors**. They conduct a weekly one-hour session.

- Its themes include nutrition and NCDs.
- Students can act as health and wellness messengers to peers, parents and family.
- Advocate for the FSSAI restriction on HFSS foods in and around schools.
- ANMs measure BMI at Adolescent Health and Wellness Days. The family practitioner can link with these through the nearest Ayushman Arogya Mandir (Health and Wellness Centre) or PHC.
- Refer children with complications or suspected secondary causes.

PEARLS

- Hallmark marker of insulin resistance: **acanthosis nigricans**.
- Exclude **diabetes and hypothyroidism** (masquerades).
- Serial growth charts, not a single BMI.
- Exam trap: adult Asian-Indian BMI cut-offs are not for children.
- Assess readiness (0–10 scale) before counselling.
- Delivery platform: School Health and Wellness Programme with teacher Ambassadors.

Web sources: [W1] MoHFW and MHRD — Operational Guidelines on School Health Programme under Ayushman Bharat — 2018 — https://nhm.gov.in/New_Updates_2018/NHM_Components/RMNCHA/AH/guidelines/Operational_guidelines_on_School_Health_Programme_under_Ayushman_Bharat.pdf · [W2] Public health approaches to combating childhood obesity in India: a mini-review (PubMed) — <https://pubmed.ncbi.nlm.nih.gov/41974918/> · [W3] PMC — Scoping review of policy instruments on overweight and obesity in India — <https://pmc.ncbi.nlm.nih.gov/articles/PMC11759891/> · [W4] Misra A, et al. — Consensus Statement for Asian Indians (adult cut-offs), J Assoc Physicians India — 2009 — <https://link.springer.com/article/10.1007/s13410-011-0056-9>

PART 41

General Medicine – Infectious Diseases

243. Fever, rash, shock with thrombocytopenia – DDx & management

ASKED 1* · 4–5–mark answer

Asked in: Oct 2023 · Paper IV · Q8(a) (5 marks)

Q (Oct 2023 · Paper IV · Q8(a)): A 28-year-old man has presented to your health centre with fever and body pain for past four days. There was no obvious focus of infection. Clinical examination reveals an erythematous rash over the chest, trunk and extremities. Pulse rate of 120 / minute. Blood pressure was 78/60 mmHg in right upper limb. There are patients with similar presentation for the past two weeks. His investigations revealed leukopenia and thrombocytopenia; WBC count of 2800/cumm and platelet count of 63,000/cumm. a) What are the possible differential diagnosis? How will you manage him? [5] You heard that there are similar fever patients in the locality from the community workers. [5]

SOURCE MUR — Fever in the traveller; zoonoses; rash — pp. 192, 1468, 1470, 1471

Differential diagnosis

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: Fever, severe aching and rash point to dengue. Viral respiratory illness, malaria, hepatitis and gastroenteritis are other common fevers.
- Serious disorders not to be missed: Malaria, typhoid/paratyphoid, meningococcal disease, encephalitis, viral haemorrhagic disease, HIV seroconversion illness.
- Pitfalls: Dengue is commonly misdiagnosed. Leptospirosis and infective endocarditis are also often missed.
- Masquerades: Drug reaction (e.g. to antimalarials) and urinary infection.
- Is the patient trying to tell me something?: Dengue is followed by severe fatigue and depression. Ask about low mood.
- Indian layer: Maculopapular rash with fever suggests dengue, HIV, typhus, leptospirosis or arbovirus infection. Petechiae suggest viral haemorrhagic fever, leptospirosis or dengue. An eschar suggests scrub typhus.
- Indian layer: Chikungunya, malaria and leptospirosis are the Indian differentials for fever with rash and shock.

Table 1: Differentials for fever + rash + shock + leukopenia/thrombocytopenia

Diagnosis	Pointer
Dengue (with shock)	Fever, myalgia, rash, then plasma leak; an epidemic cluster supports it
Malaria	"All fever... malaria until proved otherwise"; confirm by microscopy/RDT
Chikungunya	Dengue-like picture, prominent joint pain
Leptospirosis	Rash, petechiae, myalgia, exposure to contaminated water/urine
Scrub typhus	Eschar
Typhoid	Step-ladder fever, relative bradycardia, rose spots late
Meningococcaemia/sepsis	Petechial rash with shock

Management

MANAGEMENT BASIS

India: NCVBDC — National Guidelines for Clinical Management of Dengue Fever — 2023 · International: WHO dengue guidelines MUR 9e, ch. 128

Immediate actions (BP 78/60, pulse 120 = shock)

- Treat as **dengue shock until proved otherwise**. Any patient with warning signs is admitted.
- Start resuscitation: secure IV access and give IV fluids. Management of severe dengue is plasma-loss replacement, correction of electrolyte and metabolic disturbances, and blood transfusion when needed.
- Send blood for haematocrit and platelet count, which are used to monitor warning signs.
- Check blood glucose, as hypoglycaemia complicates severe malaria.

Confirm and exclude

- Confirm dengue by NS1 antigen ELISA, IgM ELISA on a single serum, PCR, or IgG seroconversion in paired sera.
- The tourniquet test is positive with 10 or more petechiae per 2.5 sq.cm.
- Send a malaria RDT or smear, since microscopy is the gold standard.
- Send blood culture, liver function tests and urine and stool tests if no obvious cause.
- Dengue-specific IgM is best taken on day 5.

Drugs

- Give **paracetamol** for fever and pain. Child dose is 10–15 mg/kg/dose, 4–6 times a day.
- **Avoid aspirin, NSAIDs and corticosteroids**, and avoid antibiotics for the viral illness. NSAIDs carry a mucosal bleeding risk.
- If malaria is confirmed, treat by species. *P. vivax* gets chloroquine for 3 days plus primaquine 0.25 mg/kg daily for 14 days. *P. falciparum* gets age-specific ACT-AL for 3 days plus a single primaquine dose on day 2.

Community cluster

- Two weeks of similar cases means a **probable outbreak**.
- Notify the PHC medical officer and district surveillance team, and record line-listing details (area, onset date, test result). Confirmed malaria cases are also notified.
- Advise the family and neighbours to avoid mosquito bites. Dengue has no vaccine.
- Educate on early return for warning signs.

REFER WHEN

- Refer or admit immediately for shock, any warning sign or rising haematocrit with falling platelets.
- Refer for bleeding, altered sensorium, or malaria with continuous vomiting, inability to sit or stand, breathing difficulty, convulsions, jaundice or no relief in 48–72 hours.
- Pre-referral: give IV fluid, keep the patient warm, and send the sample details and a referral note.

PEARLS

- Dengue shock: fever, thrombocytopenia, leukopenia and shock, usually after the febrile phase.
- Fever + severe aching + rash points to dengue.
- Paracetamol is the only antipyretic. Avoid NSAIDs and aspirin.
- Always exclude malaria in a febrile patient.
- A cluster of cases is an outbreak, so notify and start vector control.

Web sources: [W1] NCVBDC, MoHFW — National Guidelines for Clinical Management of Dengue Fever — 2023 — <https://ncvdbc.mohfw.gov.in/Doc/National%20Guidelines%20for%20Clinical%20Management%20of%20Dengue%20Fever%202023.pdf> · [W2] NCVBDC, MoHFW — Malaria Training Module for ASHA — 2025 — <https://ncvdbc.mohfw.gov.in/Doc/Malaria-Training-Module-ASHA-2025.pdf>

244. Integrated vector control in a malaria outbreak

ASKED 1* · 6–7–mark answer

Asked in: May 2024 · Paper IV · Q2(a,c) (6 marks)

Q (May 2024 · Paper IV · Q2(a,c)): You have diagnosed 17 cases of malaria in a village of population of 1000 in the last one month. There was only one or two cases diagnosed in the previous months. a) Which are the vectors that transmit Dengue fever, Malarial fever and Chikungunya? [2] c) How will you apply integrated vector control measures in the village? [4]

SOURCE HAR — Ch. 231 Malaria — pp. 1762, 1773

Vectors of dengue, malaria and chikungunya

Table 1: Vectors

Disease	Vector	Biting habit / breeding
Malaria	Female Anopheles mosquito. In rural India the major vector is An. culicifacies .	Peak feeding is dusk to dawn.
Dengue	Aedes aegypti	Bites in the daytime. Breeds in containers in and around houses.
Chikungunya	Aedes aegypti , the same vector as dengue	Same as dengue.

- *Aedes albopictus* can also transmit dengue and chikungunya.
- Only the female anopheline transmits malaria. It must survive more than 7 days, because sporogony in the mosquito takes 8–30 days.

Applying integrated vector control in the village

- **Integrated vector management (IVM)** under NCVBDC (NVBDCP) means using all feasible methods together. The malaria components are indoor residual spraying (IRS) in selected high-risk areas, long-lasting insecticidal nets (LLINs), larvivorous fish, and anti-larval measures with source reduction.
- Use IVM together with early diagnosis and prompt treatment. Every confirmed case should be treated within 24 hours of detection and notified.

Steps in the village

- **Confirm the outbreak**
 - 17 cases in one month, against 1–2 in earlier months, is a rise above the usual level.
 - Do fever surveillance with RDT or microscopy for every febrile person.
 - Inform the district programme officer so that rapid response teams can come.
- **Adult mosquito control**
 - **IRS** with insecticide on indoor walls. Pyrethroid-treated nets work where vectors bite indoors at night.
 - Distribute **LLINs** and make sure they are used, especially by children and pregnant women.
 - Use of ITNs and IRS is an integrated vector control measure.
- **Larval control and source reduction**
 - Survey for breeding sites: ground-water collections, ponds, paddy fields, wells and water storage containers.

- Introduce **larvivorous fish** in ponds and wells.
- Apply larvicides, including bio-larvicides, and carry out minor environmental engineering such as filling and draining, to reduce sources.
- For Aedes, remove or cover water containers, tyres and coconut shells. This also controls dengue and chikungunya.
- **Personal protection**
 - Avoid exposure from dusk to dawn.
 - Use repellents containing 10–35% DEET, suitable clothing and bed nets.
- **Community involvement**
 - Health education through IEC and behaviour change communication involving the community.
 - Involve ASHAs, the panchayat, the Anganwadi worker and the school.
- **Monitoring**
 - Do entomological surveillance, with vector density checked before and after spraying.
 - Do weekly fever surveillance and check that case numbers are falling.
 - Check spray coverage, net use and insecticide resistance. Pyrethroid resistance threatens control.

PEARLS

- Vectors: Anopheles (malaria); Aedes aegypti (dengue and chikungunya).
- IVM = IRS + LLIN + larvivorous fish + source reduction + community participation.
- Malaria transmission needs a vector that survives more than 7 days.
- Treat confirmed cases within 24 hours and notify.

Web sources: [W1] NVBDCP — Annual Report 2014–15 — <https://ncvbdc.mohfw.gov.in/Doc/Annual-report-NVBDCP-2014-15.pdf> · [W2] NVBDCP — Long Term Action Plan for Prevention and Control of DF/DHF/DSS and Chikungunya in India — https://ncvbdc.mohfw.gov.in/Doc/long_term_Action_Plan.pdf · [W3] NCVBDC — Vector control under NVBDCP (dengue and chikungunya) — <https://ncvbdc.mohfw.gov.in/WriteReadData/l892s/58776818451539082247.pdf> · [W4] NCVBDC — Operational Manual for Malaria Elimination in India — 2016 — <https://ncvbdc.mohfw.gov.in/WriteReadData/l892s/5232542721532941542.pdf>

245. NTEP/RNTCP – objectives, recent changes, diagnosis, categorisation, treatment regimens

ASKED 4* · 10–mark answer

Asked in: Dec 2021 · Paper IV · Q8 (10 marks) · Jun 2022 · Paper IV · Q7 (10 marks) · Oct 2023 · Paper IV · Q10 (10 marks) · May 2024 · Paper IV · Q7 (10 marks)

Q (Dec 2021 · Paper IV · Q8): What are the recent changes in Revised National Tuberculosis programme and what advice will you give to a patient who has been initiated on anti-tuberculous treatment. [10]

Q (Jun 2022 · Paper IV · Q7): What are the aims and objectives of Revised National TB Control Programme of India (elimination program 2020)? How does this programme help to achieve elimination of TB from India? With regard to HIV infection, what are the recommendations by the program? [10]

Q (Oct 2023 · Paper IV · Q10): A 35-year-old, a daily wage labourer presented with weight loss, cough and expectoration for past 3 weeks, with evening rise of fever: a) What are the objectives of Revised National Tuberculosis Control Programme? [2] b) How is the diagnosis, categorization of Tuberculosis done under RNTCP? [4] c) Write about the treatment regimens of Tuberculosis according to RNTCP? [4]

Q (May 2024 · Paper IV · Q7): a) Mention the objectives of the recent National Tuberculosis Programme. [2] b) Write briefly about the following as per the National Tuberculosis Programme: [2] i) Diagnosis of Tuberculosis. [2] ii) Categorization. [2] iii) Treatment of Tuberculosis. [2]

SOURCE MUR — Baffling bacterial infections (tuberculosis) — pp. 187–188 · HAR — Ch. 183 Tuberculosis — pp. 1394, 1401–1403

Aims and objectives of the programme (RNTCP → NTEP)

- **Name:** The Government of India renamed RNTCP as the National TB Elimination Programme (NTEP) in 2020.
- **Goals under the NSP 2017–2025:** 80% reduction in incidence, 90% reduction in mortality, and zero TB-affected households facing catastrophic costs.
- **Strategy:** four pillars, "Detect – Treat – Prevent – Build" (DTPB).
- **Objectives:**

- Early diagnosis of TB patients, and prompt treatment with quality-assured drugs and regimens.
- Patient-centric treatment support and nutrition support through direct benefit transfer.
- Contact tracing and TB preventive treatment (TPT) for household contacts, children, PLHIV and high-risk groups.
- Engaging patients who seek care in the private sector.

Recent changes in RNTCP/NTEP

- **Universal DST:** all TB patients are tested upfront for rifampicin resistance with an NTEP-approved rapid NAAT.
- **Daily regimen:** daily fixed-dose combination (FDC) of first-line drugs in weight bands is the principle of treatment.
- **Category II withdrawn:** the previously treated group was earlier given the CAT II regimen, which is now withdrawn from NTEP.
- **Rifampicin-sensitive TB:** all RS-TB cases get the standard regimen even if treated in the past.
- **DR-TB:** India has moved fully to the shorter oral bedaquiline-containing MDR/RR-TB regimen. The 2022 change introduced a new 6-month (26-week) regimen.
- **TPT scope:** since 2021–22 it covers all household contacts of microbiologically confirmed pulmonary TB, whatever their age.
 - Under-5 contacts and PLHIV are treated after active TB is excluded, with no infection test.
 - Regimens: 3HP (12 weekly doses, age ≥ 2 years), 3RH (84 daily doses, < 15 years) and 6H.
 - The 2025 letter adds 6Lfx for contacts of DR-TB patients, and 4R.
- **Nutrition support:** Ni-kshay Poshan Yojana gives a monthly incentive of Rs 1,000. Earlier the amount was Rs 500 per month.
- **TB Mukh Bharat Abhiyaan (2025):** every person with TB is assessed for drug resistance and comorbidity (HIV, diabetes, undernutrition, alcohol, tobacco).

How the programme helps achieve elimination

- **Detect:** mandatory notification, expanded diagnostics, and decentralised screening to Ayushman Arogya Mandir (Health and Wellness Centre) level.
- **Thrust areas of the NSP:** private sector engagement, plugging leaks in the TB care cascade, active case finding in key populations, and protection of high-risk groups.
- **Treat:** free quality drugs, universal DST and DOT-based daily FDC.
- **Prevent:** contact tracing and TPT, which breaks the reservoir of infection. Of the global population, nearly 2 billion have been infected, and new cases keep emerging from this pool.
- **Build:** surveillance through Nikshay, and DBT and Ni-kshay Mitra support.
- **Comorbidity and nutrition:** these are addressed because almost 46% of notified cases are undernourished.

HIV infection – programme recommendations

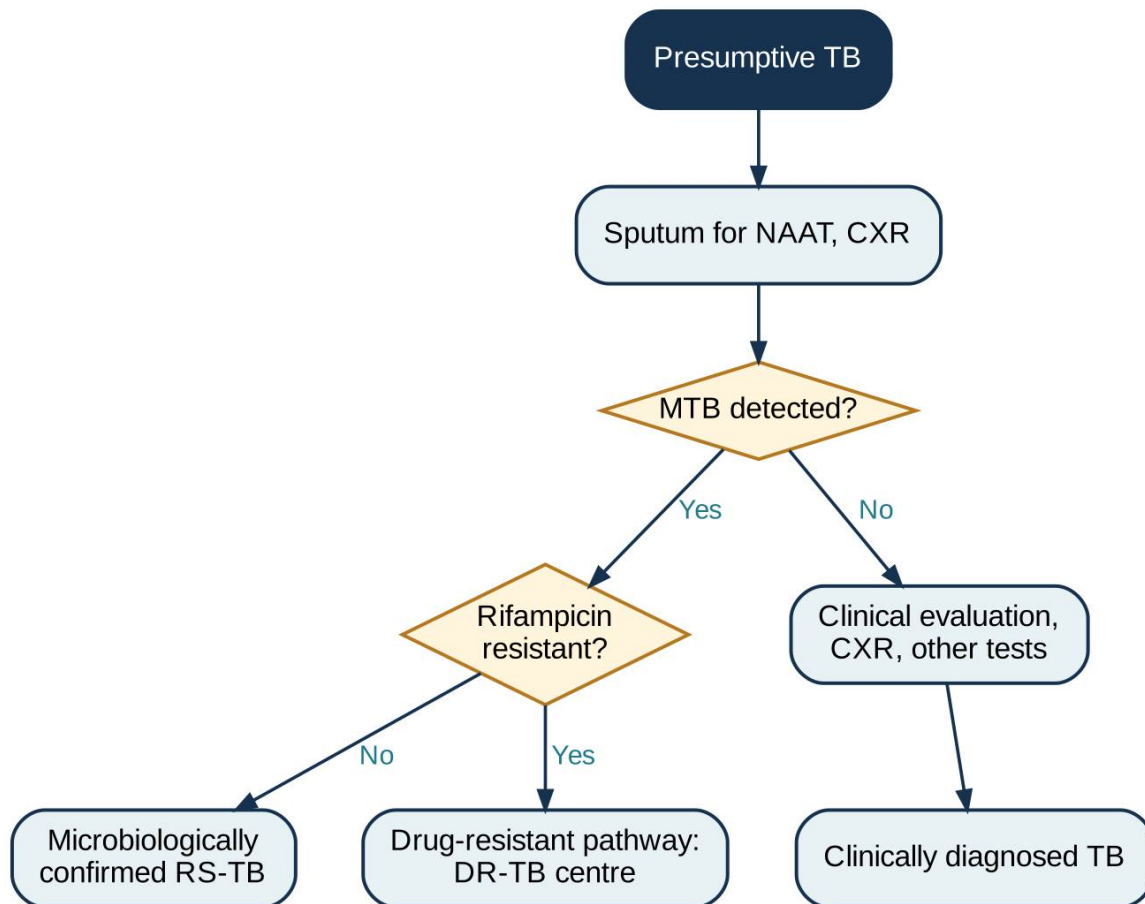
- **Screening and care:** every person with TB is assessed for HIV. NTEP runs a single-window TB-HIV service.
- **TPT:** PLHIV get TPT after active TB is excluded, without an infection test.
 - Screen with the four-symptom algorithm (cough, fever, weight loss, night sweats).
 - If any one symptom is present, investigate for active TB first.
- **BCG:** it must not be given to HIV-infected persons.
- **ART interaction:** dolutegravir must be raised to 50 mg twice daily when given with rifampicin.

Diagnosis of tuberculosis

- **Presentation (this case):** weight loss, cough with expectoration for ≥ 2 weeks, and evening rise of fever, in a labourer (a high-risk setting). Suspect pulmonary TB.
- **Initial tests:** chest X-ray and sputum microscopy.
- **NTEP step:** upfront NAAT on sputum for TB and rifampicin resistance.
- **Extrapulmonary TB:** risk-assess all patients for drug resistance before treatment. DST is available for those at risk.

- **Tuberculin test and IGRA:** these show infection, not disease. The tuberculin test "is not a good test to diagnose TB". They cannot separate active TB from infection.

Flowchart 1: Diagnostic approach under NTEP



Categorisation

- **By bacteriology:** microbiologically confirmed versus clinically diagnosed TB.
- **By site:** pulmonary versus extrapulmonary.
- **By past treatment:**
 - New case: never treated for TB, or anti-TB drugs taken for less than one month.
 - Recurrent case: previously declared cured or treatment completed, and now microbiologically confirmed again.
 - Treatment after failure: failed at the end of the most recent course.
- **By drug resistance:** rifampicin-sensitive TB versus MDR/RR-TB. XDR-TB is MDR/RR-TB plus resistance to a fluoroquinolone and at least one of bedaquiline or linezolid.
- **By HIV status:** HIV-positive versus HIV-negative.
- **Current practice:** the old CAT I/II/III categories are no longer used. Regimens depend on rifampicin sensitivity, not on past treatment.

Treatment regimens

MANAGEMENT BASIS

India: NTEP/ICMR — Standard Treatment Workflow for TB (NTEP) — 2022; NTEP DR-TB guideline — 2024 ·
International: HAR 22e ch.183 (WHO-based)

- **Drug-sensitive TB: 2HRZE/4HRE, daily FDC in weight bands, under direct observation.**
 - Intensive phase: 8 weeks (56 doses) of H, R, Z and E.
 - Continuation phase: 16 weeks (112 doses) of H, R and E daily.

- Only pyrazinamide is stopped in the continuation phase. The intensive phase is not extended.
- Continuation phase is extended up to 24 weeks in CNS and skeletal TB. In disseminated TB or slow response, the physician may extend case by case.
- **MDR/RR-TB:** shorter oral bedaquiline-containing regimen of 26 weeks.
 - The international longer regimen (18–20 months) uses Group A drugs: levofloxacin or moxifloxacin, bedaquiline and linezolid.

Table 1: India · International – drug-sensitive TB regimen

Feature	India (NTEP)	International (MUR/HAR)
Intensive phase	2 months HRZE, daily	2 months HRZE, daily
Continuation phase	4 months HRE, daily	4 months HR
Delivery	Weight-band FDC, DOT	Thrice-weekly DOT an option

Advice to a patient started on anti-TB treatment

MANAGEMENT BASIS

India: NTEP — Guidelines for Programmatic Management of TB Preventive Treatment in India — 2021; NTEP — Guidance Document on TB Mukh Bharat Abhiyaan — 2025

- **Duration:** treatment lasts 6 months or more. Take the daily FDC without missing doses, ideally under observation.
- **Do not stop early:** poor compliance risks relapse and MDR-TB.
- **Side effects:** usual precautions are needed.
 - Report jaundice, vomiting, abdominal pain, visual or neurological symptoms at once.
 - Isoniazid users should take pyridoxine 25 mg daily.
- **Infection control:** cover the cough and keep rooms ventilated.
- **Household contacts:** screen them for symptoms. Eligible contacts receive TPT.
- **Comorbidity:** HIV and diabetes testing is offered. Stop tobacco and alcohol.
- **Nutrition and support:** Ni-kshay Poshan Yojana (Rs 1,000 per month through DBT) and Ni-kshay Mitra.
- **Notification:** the case is notified in Nikshay.

PEARLS

- RNTCP became NTEP in 2020. NSP 2017–2025 pillars: Detect–Treat–Prevent–Build.
- Standard regimen: **2HRZE/4HRE**, daily FDC, 56 + 112 doses.
- **CAT II is withdrawn**, and there is no intensive-phase extension.
- Universal DST: NAAT for rifampicin resistance in all patients.
- MDR/RR-TB: **26-week** oral bedaquiline regimen.
- TPT: 3HP (≥ 2 years), 3RH (< 15 years). PLHIV and under-5 contacts: treat-only. DR-TB contacts: 6Lfx.
- Trap: the tuberculin test is not a diagnostic test for active TB.

Web sources: [W1] Press Information Bureau (GoI) — India Speeding Towards TB Elimination — 2026 — <https://static.pib.gov.in/WriteReadData/specificdocs/documents/2026/mar/doc2026324833001.pdf> · [W2] DGHS, MoHFW — National Tuberculosis Elimination Programme — <https://dghs.mohfw.gov.in/national-tuberculosis-elimination-programme.php> · [W3] NTEP — Guidance Document on TB Mukh Bharat Abhiyaan — 2025 — https://tbcindia.mohfw.gov.in/wp-content/uploads/2025/09/Guidance-Document-on-TB-Mukh-Bharat-Abhiyan_0.pdf · [W4] NTEP, Central TB Division — National Guidelines for Management of Drug Resistant TB — 2024/2025 — https://tbcindia.mohfw.gov.in/wp-content/uploads/2025/01/National-Guidelines-for-Management-of-DR-TB_Final.pdf · [W5] ICMR — Standard Treatment Workflow, NTEP — 2022 — https://www.icmr.gov.in/icmrobject/uploads/STWs/1725964686_2_ntep_18032022.pdf · [W6] NTEP — Paediatric TB Management Guideline VI — 22 Aug 2022 — https://tbcindia.mohfw.gov.in/wp-content/uploads/2023/05/9534339438Paediatric_TB_Management_Guideline_22082022_VI.pdf · [W7] NTEP — Guidelines for Programmatic Management of TB Preventive Treatment (FAQ); letter on TPT expansion — 2021/2025 — https://tbcindia.mohfw.gov.in/wp-content/uploads/2023/05/7882122892Frequently_Asked_Questions_PMTPT.pdf · [W8] PMC — National TB elimination programme — What has changed — <https://pmc.ncbi.nlm.nih.gov/articles/PMC9672688/> · [W9] NTEP — INDEX-TB Guidelines — <https://tbcindia.mohfw.gov.in/wp-content/uploads/2023/05/5585665076Index-TB-Guidelines.pdf> · [W10] MoHFW — National Strategic Plan for TB Elimination 2017–2025 — https://extranet.who.int/cpcd/sites/default/files/public_file_re

pository/IND_India_National-Strategic-Plan-for-TB-Elimination_2017-2025.pdf

246. ATT – causes of default, adherence measures, adverse effects

ASKED 1* · 10-mark answer

Asked in: Jun 2020 · Paper IV · Q9 (10 marks)

Q (Jun 2020 · Paper IV · Q9): A 45-year male had been diagnosed to have TB and started on anti-tubercular treatment (ATT). He returns in two weeks to say that his fever is persisting. What are the common causes of discontinuation of ATT? What measures can you take to ensure compliance? What are the common side effects and adverse effects of the first line ATT? [10]

SOURCE HAR — ch.183 Tuberculosis; ch.186 Antimycobacterial Agents — pp. 1398, 1403, 1421 · PSM — National TB Elimination Programme — p. 499

Approach to persistent fever two weeks into ATT

SAFE DIAGNOSTIC STRATEGY

- Probability diagnosis: Fever can persist for weeks on effective ATT. First check adherence, regimen and dosing before calling it failure. Treatment failure is attributed to incomplete adherence, poor absorption or resistance.
 - Serious disorders not to be missed: Drug-resistant TB, which almost invariably follows monotherapy, missed doses, poor-quality drugs or crushed tablets. In HIV co-infection, IRIS is a diagnosis of exclusion. Also consider hepatotoxicity (see the adverse effects section).
 - Pitfalls: Assuming fever means failure and changing the regimen without repeating DST. Repeat DST if resistance is suspected, and add at least two effective drugs only if resistance is documented or strongly suspected.
 - Masquerades: Adverse drug reaction or co-infection can mimic non-response. Ask about HIV, diabetes, undernutrition, alcohol and tobacco use.
 - Is the patient trying to tell me something?: A patient who returns early with a complaint may be missing doses because of side effects, cost, travel or stigma. Ask directly and non-judgementally.
 - Indian layer: Standard regimen is daily FDC **2HRZE/4HRE** under direct observation. All TB patients should have upfront rifampicin-resistance testing by an NTEP-approved rapid NAAT.
- Review at this visit:
 - Pill or blister-pack count and Ni-kshay adherence record.
 - Weight-band dosing.
 - Symptoms of ADR (jaundice, vomiting).
 - HIV, blood sugar and DST/NAAT results.
 - Consider referral to the TB Unit / District TB Centre if there is no response, abnormal liver function or suspected resistance.

Common causes of discontinuation of ATT

Table 1: Causes of interruption or default

Domain	Cause
Drug-related	Adverse drug reactions are a major challenge to adherence and completion
Disease-related	Early symptomatic relief, a long course, and failure to understand why the full course is needed
Patient-related	Alcohol use, undernutrition (affects drug tolerance and adherence)
Access-related	Frequent travel for work, an inconvenient DOT centre, stigma concerns
Health-system	Interrupted drug supply, no treatment supporter

- Poor adherence leads to drug resistance, failure, relapse and death.

Measures to ensure compliance

- **Supervised treatment** with patient support, and checking that patients complete the course.
- **DOTS:**

- Combines supervised treatment, motivation by a health or non-health worker, and monitoring of response.
- Daily FDCs in weight bands, given under direct observation.
- **Digital adherence:**
 - Ni-kshay integrates adherence technologies such as 99DOTS and MERM.
 - 99DOTS suits patients who travel often, live far from a DOT centre or fear stigma. Medicine refills come from a facility or an ASHA.
- **Treatment supporter** with an honorarium, and a **DBT nutrition incentive** (Ni-kshay Poshan Yojana).
- **Counselling:**
 - Educate about the course length, expected side effects and what to report.
 - Involve the family, and use incentives where useful.
- **Comorbidity and nutrition:** Assess HIV, diabetes, undernutrition, alcohol and tobacco use in every patient.
- **Monitoring:** Tell patients to stop the drug and report at once if hepatitis symptoms develop. Review monthly and dispense no more than a 1-month supply to high-risk patients.
- **Defaulter tracing:** Home visit by the health worker or ASHA, and tracing through Ni-kshay (notification is mandatory).

Common side effects and adverse effects of first-line ATT

- Almost all anti-TB drugs cause adverse reactions, ranging from minor to fatal.
- **Isoniazid:**
 - Hepatotoxicity. Isoniazid should not be given in active liver disease.
 - Peripheral neuropathy, prevented by pyridoxine in those at risk of B6 deficiency.
 - High-risk groups (daily alcohol use, previous liver disease) need baseline and monthly liver function tests.
- Prolonged **pyrazinamide** is associated with a higher risk of liver toxicity.
- Handle other reactions (gastrointestinal, rash, visual, joint) as per the NTEP *Guidelines for Prevention and Management of Adverse Reaction associated to Anti TB drug*.
- Key action: If symptoms of hepatitis appear, stop ATT and refer.

PEARLS

- DS-TB regimen in India: **2HRZE/4HRE**, daily FDC, directly observed.
- Persistent fever at 2 weeks: check adherence first, then resistance (repeat DST), HIV/IRIS and ADR.
- Resistance follows monotherapy and missed or poor-quality drugs.
- Isoniazid: hepatitis and neuropathy (give pyridoxine).
- TB notification is mandatory in India.
- Trap: never add a single drug to a failing regimen.

Web sources: [W1] NTEP — TB Mukht Bharat Abhiyaan guidance document — 2025 — https://tbcindia.mohfw.gov.in/wp-content/uploads/2025/09/Guidance-Documents-on-TB-Mukht-Bharat-Abhiyan_0.pdf · [W2] ICMR — Standard Treatment Workflow, Drug-sensitive TB treatment as per NTEP — 2022 — https://www.icmr.gov.in/icmrobject/uploads/STWs/1725964686_2_ntep_18032022.pdf · [W3] PMC — ADRs in patients receiving treatment under NTEP, India — 2025 — <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11811607/> · [W4] PMC — Ni-kshay Poshan Yojana evaluation — 2024 — <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11265306/> · [W5] BMC Infectious Diseases — Impact of 99DOTS in North India — 2023 — <https://link.springer.com/article/10.1186/s12879-023-08418-2> · [W6] NTEP — DBT Manual for NTEP — <https://tbcindia.mohfw.gov.in/wp-content/uploads/2023/05/23294204DBTManualForNTEP.pdf> · [W7] NHM — National TB Elimination Programme (Central TB Division) — 2024 — <https://www.nhm.gov.in/pdf/2024/ntep.pdf> · [W8] NTEP — Guidelines page (Prevention and Management of Adverse Reaction associated to Anti TB drug) — <https://tbcindia.mohfw.gov.in/guidelines/>

247. Vertical transmission, PPTCT under NACP & PEP

ASKED 1* · 10-mark answer

Asked in: Oct 2023 · Paper IV · Q9 (10 marks)

Q (Oct 2023 · Paper IV · Q9): A 28-year-old was found to be HIV positive during her ANC: a) Discuss vertical transmission of HIV infection. [3] b) What are the various modalities for prevention of vertical transmission of HIV under National AIDS Control Programme? [3] c) Discuss the post exposure prophylaxis in HIV. [4]

SOURCE HAR — ch. 208 HIV Disease — pp. 1562–1563, 1625–1626

Vertical transmission of HIV

- **Routes:** HIV passes from an infected mother to her infant intrapartum, perinatally, or via breast milk. No other modality has been shown.
- **Risk without intervention:** NACO uses a conservative vertical transmission rate of about 30% (range 20–45%).
- **Maternal viral load:** Plasma viral load is the primary determinant of transmission risk.
 - Transmission is highest in early infection and in advanced disease with high viral set points.
 - ART that suppresses the viral load greatly reduces transmission.
- **Co-factors (Harrison's, sexual-transmission section):** Other STIs and genital ulcers increase HIV transmission.
- **Elimination benchmark:** A vertical transmission rate below 2% in non-breastfeeding populations, or below 5% in breastfeeding populations.
- **Indian programme goal:** NACP Phase V aims at dual elimination of vertical transmission of HIV and syphilis.

Prevention of vertical transmission under NACP

Table 1: PPTCT / EVTHS components (NACO)

Stage	Intervention
Antenatal	Screen every pregnant woman for HIV and syphilis (dual RDT)
HIV-positive pregnant woman	Lifelong ART from detection, irrespective of CD4 count and WHO clinical stage (policy since 1 Jan 2014)
Labour and delivery	Continue ART through labour, delivery and thereafter, lifelong
Infant at birth	Syrup nevirapine for 6 weeks, started immediately after birth
Late or short maternal ART	Extend infant nevirapine to 12 weeks if maternal ART lasted less than 24 weeks
Infant follow-up	Cotrimoxazole prophylaxis from 6 weeks
Early infant diagnosis	HIV DNA PCR on dried blood spot at 6 weeks; repeat if positive
Confirmed infected infant	Lifelong ART at the earliest after two positive DNA PCR tests
Final status	Confirm HIV status at 18 months with antibody tests

- **Aim of postpartum ART and infant prophylaxis:** To reduce transmission through breastfeeding.
- **Guideline in force:** The 2024 national guideline combines HIV and syphilis elimination.
- **Older regimen:** Single-dose nevirapine to the mother in labour and to the infant at birth was used earlier. It is less effective than ART-based regimens.
- **Other general measures:** Condoms, STI treatment and avoiding needle-sharing are part of the prevention toolkit.

Post-exposure prophylaxis (PEP) in HIV

- **Risk after occupational exposure without PEP:** About 0.23% after a percutaneous exposure and about 0.09% after a mucous membrane exposure.
- **Factors raising the risk of transmission:**
 - Deep injury.
 - Visible blood on the instrument.
 - A device that had been placed in the source patient's vein or artery.
 - Advanced HIV disease in the source patient.

- **First aid:** Whatever the PEP decision, cleanse the wound immediately and apply antiseptic.
- **Urgency:** Treat occupational exposure as a medical emergency.
- **Timing:** Start PEP as early as possible and definitely within 72 hours.
 - It is not recommended more than 72 hours after exposure.
- **Regimen:** The US Public Health Service recommends three or more antiretroviral drugs for 4 weeks for all occupational exposures.
 - Adherence is emphasised.
 - Consider pregnancy or breastfeeding, possible drug-resistant virus and drug toxicity when choosing the regimen.
- **Follow-up:**
 - Counselling.
 - Baseline and follow-up HIV testing.
 - Monitoring for drug toxicity.
 - Appointments begin within 72 hours and may end 4 months after exposure.
- **Non-occupational (sexual) exposure:** A condom rupture in a serodiscordant couple is an exposure. Start PEP within 72 hours and counsel on consistent condom use.
- **After the 28-day course:** People with continuing exposure can start PrEP.
- **Prevention at work:** Use universal precautions, and avoid recapping needles and unsafe sharps disposal.
 - Offer HBV vaccine to health care workers, because HBV risk after a needle-stick is much higher than HIV risk.

PEARLS

- Vertical transmission occurs intrapartum, perinatally, or via breast milk.
- Indian policy since 2014: lifelong ART for every HIV-positive pregnant woman irrespective of CD4 count.
- Infant nevirapine for 6 weeks (12 weeks if maternal ART was under 24 weeks). DNA PCR at 6 weeks.
- Elimination benchmark: vertical transmission below 2% (non-breastfeeding) or below 5% (breastfeeding).
- PEP: start within 72 hours, give 3 or more drugs for 28 days.
- Percutaneous exposure risk is about 0.23%.

Web sources: [W1] NACO — Paediatric ART Guidelines (vertical transmission rate estimate) — 2014 — https://naco.mohfw.gov.in/files/Pediatric_14-03-2014.pdf · [W2] PMC — Projected impact of fast-tracking ART on vertical transmission of HIV in India — 2024 — <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11410226/> · [W3] NACO — National Guidelines for Elimination of Vertical Transmission of HIV and Syphilis — 2024 — <https://naco.gov.in/documents/policy-guidelines> (NACP Phase V goal and dual screening; National HIV Counselling and Testing Guidelines 2024 — <https://naco.gov.in/documents>) · [W4] NACO — Elimination of Vertical Transmission of HIV & Syphilis (programme page) — <https://naco.gov.in/elimination-vertical-transmission-hiv-syphilis> · [W5] NACO — National Guidelines for PPTCT of HIV — https://naco.mohfw.gov.in/files/National_Guidelines_for_PPTCT_0.pdf · [W6] NACO — Paediatric ART Guidelines (single-dose nevirapine) — 2014 — https://naco.mohfw.gov.in/files/Pediatric_14-03-2014.pdf · [W7] NACO — National Guidelines for HIV Care and Treatment — 2021 — <https://naco.mohfw.gov.in/division/care-support-and-treatment/care-support-and-treatment-archive/>

248. Treating malaria & implementing malaria elimination framework

ASKED 1* · 10-mark answer

Asked in: Jun 2025 · Paper IV · Q10 (10 marks)

*Q (Jun 2025 · Paper IV · Q10): You have been appointed as a medical officer in-charge of a community health centre in a district with high incidence of malaria (both *P. Vivax* and *P. Falciparum*). a) How will you treat an adult with fever and blood smear positive for malaria? [5] b) How will you implement "malaria control" in the community served by your health center according to the national framework for malaria elimination in India? [5]*

SOURCE HAR — Ch. 231 Malaria — pp. 1760, 1766–1767, 1773 · MUR — Travellers' health and tropical medicine — p. 1469

Treatment of an adult with fever and a malaria-positive smear

MANAGEMENT BASIS

India: NCVBDC (NVBDCP) — National Drug Policy on Malaria / Diagnosis and Treatment of Malaria in India — 2013
 · International: WHO Guidelines for malaria

Confirm and classify

- Malaria is not a clinical diagnosis. Microscopy is the gold standard, and an RDT is used when reliable microscopy is not available.
- Report the **species** (*P. falciparum*, *P. vivax* or mixed) before choosing the drug, because the regimen depends on it.
- Look for warning signs of severe malaria. These are continuous vomiting, inability to sit or stand, inability to drink, breathing difficulty, confusion, drowsiness or convulsions, bleeding, jaundice, and no relief within 48–72 h of treatment.
- Any warning sign means treat as severe malaria and refer or admit to a CHC/FRU or district hospital.
- Check pregnancy and G6PD status before primaquine.

Uncomplicated malaria: species-wise regimen**Table 1: Uncomplicated malaria regimen in an adult (India)**

Species	Schizontocide	Gametocidal / radical cure
<i>P. vivax</i>	Chloroquine for 3 days	Primaquine 0.25 mg/kg daily for 14 days
<i>P. falciparum</i>	Age-specific ACT-AL for 3 days	Primaquine single dose on day 2
Mixed (Pv + Pf)	ACT-AL for 3 days	Primaquine 0.25 mg/kg daily for 14 days

- Give the first dose under supervision and ask the patient to take the drug with food.
- Primaquine needs a hypnozoite-targeting course in vivax because dormant liver forms cause relapse.
- Primaquine is not needed for radical cure in transfusion-acquired malaria, because there is no liver stage.
- Pregnant women with vivax malaria should not get primaquine. They receive chloroquine suppressive prophylaxis (5 mg base/kg weekly) until 1 month after delivery, and then radical treatment.
- Avoid tafenoquine unless G6PD activity is quantitatively tested, because of the risk of protracted haemolysis.

Supportive care and counselling

- Give antipyretics (paracetamol) and fluids.
- Tell the patient to report **dark urine or blue lips** immediately and to stop primaquine in that case.
- Persisting *P. falciparum* gametocytes after a full course do not mean drug resistance, so no re-treatment is needed.
- Follow up on day 3 and day 14, and at 28 days if indicated. Return at once if fever persists, as treatment failure or severe disease is then possible.

Severe or complicated malaria

- Stabilise and refer. Pre-referral care is the same as in the complication measures below.
 - Hypoglycaemia: slow IV 20% dextrose 2 mL/kg over 10 min, then 10% dextrose infusion 0.10 g/kg per hour, with regular glucose checks.
 - Convulsions: IV or rectal benzodiazepines.
 - Pulmonary oedema: sit the patient at 45°, give oxygen and IV diuretics.
 - Acute kidney injury: restrict fluids if creatinine rises despite rehydration, and start renal replacement early.
 - Bleeding: fresh blood and IV vitamin K.
 - Consider antibiotics if the patient deteriorates despite antimalarials.

Implementing malaria control under the National Framework for Malaria Elimination

- The **National Framework for Malaria Elimination (NFME) 2016–2030** was launched in February 2016.
- Its vision is to eliminate malaria nationally. India's intermediate target is zero indigenous cases by 2027, and elimination by 2030.
- A high-burden district with both Pv and Pf falls under the **intensified control phase** (Category 3). High-burden areas must reduce the burden first before moving to elimination.



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