Atrial Tachyarrhythmias

A-FIB • FLUTTER • MAT **KMU - FINAL YEAR MBBS**

1. THE "BIG THREE" COMPARISON

Feature	A-Fib (Fibrillation)	A-Flutter	MAT (Multifocal)
Pathology	**CHAOS**. Multiple micro-wavelets.	**CIRCUIT**. Single re-entry loop.	**IRRITATION**. Multiple firing spots.
Rhythm	**Irregularly Irregular**	**Regular** (usually)	**Irregularly Irregular**
P-Waves	**ABSENT** (Wavy baseline)	**Saw-Tooth** (F-waves)	**PRESENT** (3+ shapes)
Key Asso.	Ischemia, Thyrotoxicosis	COPD, Rheumatic	**COPD / Hypoxia**

2. ATRIAL FIBRILLATION (THE "BAG OF WORMS")

ECG Hallmarks:
1. **NO P-waves** (Atria are quivering, not contracting).
2. **Irregularly Irregular** QRS complexes.

Causes (PIRATES Mnemonic):
- **P**ulmonary (PE, COPD).
- **I**schemia / IHD.
- **R**heumatic Heart Disease (Mitral Stenosis).
- **A**nemia / Atrial Myxoma.
- **T**hyrotoxicosis / Toxins (Alcohol - "Holiday Heart").
- **E**thanol / Endocarditis.
- **S**epsis / Sick Sinus Syndrome.

3. A-FIB MANAGEMENT HIGH YIELD

Strategy: "Rate Control vs Rhythm Control"
1. Rate Control (First Line):
- **Beta Blockers** (Metoprolol) or **CCB** (Diltiazem).
- *Digoxin* only if sedentary or HF.

2. Rhythm Control (Shock/Drugs):
- **Cardioversion** (DC Shock) if Unstable.
- **Amiodarone/Flecainide** if Stable.
- *Warning:* If AFib > 48hrs, **Must Anticoagulate** for 3 weeks OR do TEE (Rule out clot) before shocking!

🛑 **STROKE RISK (CHA2DS2-VASc)**
If Score ≥ 2 (Men) or 3 (Women) → **START ANTICOAGULATION** (Warfarin/DOAC).
**Note: Aspirin is NOT enough for AFib stroke prevention.*

4. ATRIAL FLUTTER (THE "SAW")

ECG Hallmarks:
- **"Saw-Tooth"** waves (Best seen in II, III, aVF).
- **Fixed Ratio:** Atria fire at 300 bpm. Ventricles respond at 150 bpm (2:1 block) or 100 bpm (3:1 block).

Management:
1. **Acute:** Same as AFib (Rate control, Anticoagulation).
2. **Definitive: Radiofrequency Ablation** (Cures the re-entry circuit).
**Ablation is more successful in Flutter than Fib.*

5. MAT (MULTIFOCAL ATRIAL TACHYCARDIA)

⚠️ **THE COPD ARRHYTHMIA**
Usually seen in severe COPD/Lung disease.
Diagnosis Criteria:
1. Heart Rate > 100 bpm.
2. **Irregular** Rhythm.
3. **≥ 3 Distinct P-wave Morphologies** in the same lead.

Treatment Trap:
- **Treat the LUNGS first!** (Oxygen, Bronchodilators).
- Magnesium / Potassium repletion.
- Rate control: **Verapamil** (CCB).
- ⛔ **CONTRAINDICATION:** Do NOT give Beta Blockers (Causes Bronchospasm in COPD) or Digoxin (Doesn't work).

6. MCQ "HOOKS" (KMU STYLE)

Scenario	Diagnosis / Answer
"Irregularly Irregular" + No P waves	**Atrial Fibrillation**
"Saw-tooth" pattern in lead II	**Atrial Flutter**
COPD patient + Irregular pulse	**MAT** (Look for 3 P-waves)
Holiday Heart (Binge drinking)	**A-Fib** (Paroxysmal)
AFib > 48h duration. Next step?	**Anticoagulate** (Don't shock yet!)
Curative treatment for Flutter?	**Catheter Ablation**

💡 **PRO TIP: PULSE DEFICIT**
In **Atrial Fibrillation**, the Apex beat (Heart rate) is often higher than the Radial pulse.
Why? Some beats are so weak they don't reach the wrist.

SVT (Supraventricular Tachycardia)

AVNRT • WPW • MANAGEMENT **KMU - FINAL YEAR MBBS**

1. WHAT IS SVT? (RECOGNITION)

The "Traffic Light" Definition:
- **Rate:** FAST (150 - 250 bpm).
- **Rhythm:** REGULAR.
- **QRS:** NARROW (< 120ms).
- **P-waves:** ABSENT (Buried inside the QRS).

Symptoms: Sudden onset palpitations ("Heart racing"), Dizziness, Anxiety (Polyuria after attack due to ANP release).

2. THE TWO TYPES (SIMPLIFIED)

Type	Mechanism	ECG Clue
AVNRT (Commonest)	Re-entry circuit is **INSIDE** the AV Node. (Fast path + Slow path).	**No P-waves**. (Buried).
AVRT (WPW Syndrome)	Re-entry via **Accessory Pathway** (Bundle of Kent).	**Delta Wave** (on resting ECG).

3. ADENOSINE: THE "RESTART" BUTTON

Mechanism: Complete AV Node Block for a few seconds.
Dose: 6mg IV (Fast push) → 12mg → 12mg.
Half-life: < 10 seconds (Must lift arm/flush saline!).
Side Effect: "Sense of impending doom" (Chest pain/Bronchospasm).
⚠️ **Asthma?** Use Verapamil instead! (Adenosine causes bronchospasm).

🛑 **THE WPW TRAP (Highly Repeated)**
If patient has WPW (Delta wave) + **AFib** (Irregular Wide Complex):
NEVER GIVE: Adenosine, Beta Blockers, Digoxin, or Verapamil.
Why? They block the AV node → forcing all impulses down the accessory path → **VFib (Death)**.
Rx: Procainamide or DC Shock.

🚨 **SVT MANAGEMENT ALGORITHM**
Step 1: Check BP/Vitals

Is Patient UNSTABLE?
(Hypotension, Chest Pain, Shock, Confusion)
👇
Synchronized DC Cardioversion

Is Patient STABLE?
👇
1. Vagal Maneuvers (Carotid Massage / Valsalva).
***For Infants: Ice pack to face.**
👇
2. Adenosine (Drug of Choice).
👇
3. Verapamil / Beta Blockers (2nd Line).

4. KMU EXAM SCENARIOS (REAL QUESTIONS)

Scenario 1 (Pregnancy):
23yo Pregnant Female (Primigravida). Palpitations. HR 168. ECG: SVT. BP Stable.
Q: First line treatment?
Ans: Adenosine. (Safe in pregnancy).

Scenario 2 (Hypotension):
33yo Male. SVT on ECG. **BP is Low/Unrecordable** (Hypotensive).
Q: Immediate Management?
Ans: DC Cardioversion. (Unstable = Shock).

Scenario 3 (Infant):
1-month-old baby. HR 220-280 bpm. Pale/Irritable.
Diagnosis: SVT (Infant HR > 220 is almost always SVT).
Rx: Vagal (Ice to face) or Adenosine.

5. THE "FROG SIGN" (CLINICAL PEARL)

What is it? Visible neck pulsation during an attack.
Mechanism: Atria contract against a closed Tricuspid valve (Cannon A-wave).
Significance: Highly specific for **AVNRT**.

Coronary Heart Disease (CHD)

CHRONIC ANGINA • RISK FACTORS **KMU - FINAL YEAR MBBS**

1. RISK FACTORS (KMU FAVORITE)

Major Risk Factors:
- Smoking, Hypertension, Diabetes, Hyperlipidemia.
- Physical Inactivity, Obesity.

🛑 **KMU MCQ TRAP:**
"Which is NOT a risk factor for Coronary Artery Disease?"
A. Smoking
B. Hyperlipidemia
C. Fasting (Answer)
D. Hypertension

2. STABLE ANGINA PECTORIS

Definition: Chest pain on **Exertion**, relieved by **Rest** or Nitrates (within 5 mins).
- **Duration:** < 20 mins.
- **Sign: Levine's Sign** (Clenched fist over sternum).
- **ECG:** Normal or ST-Depression during pain.
- **Troponin:** Negative.

Diagnosis (KMU Scenario):
63yo female, abnormal stress test with reversible ischemia.
Next Best Step: Coronary Angiography (Gold Standard).

3. DRUG MECHANISMS HIGH YIELD

Drug	Action (MCQ Answer)
Nitroglycerin	**Venodilation** (Decreases Preload). **Does NOT dilate calcified coronary arteries directly.*
Beta Blockers	Decreases Heart Rate & Contractility (O2 demand).
Aspirin	Antiplatelet (Mortality Benefit).
Statins	Plaque Stabilization (Anti-inflammatory).

4. PRINZMETAL (VARIANT) ANGINA

Scenario (KMU 2024):
- 30yo Female Smoker (Young patient).
- Wakes up at night/early morning with chest pain.
- **ECG:** Transient **ST-Elevation** that *disappears* after 15 mins.

Pathology: Coronary Vasospasm (Not a clot!).
Treatment: Calcium Channel Blockers (Diltiazem).
⚠️ **Avoid:** Beta Blockers (Can worsen spasm).

5. MANAGEMENT: STENT VS CABG?

When to choose CABG (Bypass Surgery) over Stent?
1. **3-Vessel Disease** (LAD + LCX + RCA).
2. **2-Vessel Disease** IF the patient is **DIABETIC**.
3. **Left Main Stem** Disease (>50%).

For 1 or 2 vessel disease (non-diabetic) -> **PCI (Stent) is preferred.*

6. KMU PAST PAPER BANK (REAL MCQS)

Q1: Target BP in Diabetic/CAD patient?
Ans: 130/80 mmHg.

Q2: Chest Pain on Walking in Cold Weather?
Ans: Stable Angina (Cold induces vasoconstriction + exertion).
**Note: If pain persists at rest = Unstable.*

Q3: Best investigation to assess severity of Aortic Stenosis?
Ans: Echocardiography.
(Commonly asked in CHD context as differential for chest pain).

7. SILENT ISCHEMIA

- **Who gets it? Diabetics** (Neuropathy masks pain) & Elderly.
- **Presentation:** "Anginal Equivalent" (Dyspnea or Fatigue on exertion).
- **Diagnosis:** Stress Test / Holter showing ST changes without pain.

Acute Coronary Syndrome (ACS)

STEMI • NSTEMI • UNSTABLE ANGINA **KMU - FINAL YEAR MBBS**

1. THE DIAGNOSTIC SPECTRUM MUST KNOW

Concept: Plaque ruptures → Thrombus forms → Ischemia.
- **Key Symptom:** Chest pain at **REST** (> 20 mins).
- **Diabetics:** Often have "Silent MI" (Dyspnea/Fatigue only).

Type	Vessel Status	ECG	Troponin
Unstable Angina	Partial Block	Normal / Depress	**Negative**
NSTEMI	Partial + **Cell Death**	Depression / T-inv	**POSITIVE**
STEMI	**Total** Occlusion	**ST Elevation**	**POSITIVE**

2. ECG LOCALIZATION (THE "SAL-I" RULE)

Remember the Leads to find the Artery:
- **S**eptal (V1, V2) → **LAD** (Proximal).
- **A**nterior (V3, V4) → **LAD** (Major).
- **L**ateral (I, aVL, V5, V6) → **LCX** (Circumflex).
- **I**nferior (II, III, aVF) → **RCA** (Right Coronary).

🛑 **THE "POSTERIOR" TRAP**
Standard ECG doesn't look at the back of the heart.
Sign: ST **Depression** in V1-V2 (Mirror image of elevation).
Action: Place leads V7-V9 on the back to confirm.

3. THE "RIGHT VENTRICULAR" INFARCT

🚨 **THE NITRO GLYCERIN TRAP**
Scenario (KMU Favorite):
Inferior MI (II, III, aVF) + Hypotension + Clear Lungs + Raised JVP.
Diagnosis: Right Ventricular MI.
Pathophysiology: RV is failing, it needs FLUID to push blood to lungs.
⛔ **CONTRAINDICATION: Nitrates & Diuretics.**
(They drop preload → RV collapses → Shock).
✅ **TREATMENT: IV FLUIDS (Preload).**

4. TIMING IS MUSCLE

Diagnosis:
- **ECG:** Must be done within **10 Minutes** of arrival.
- **Troponin:** Rises at **4 hrs**. Peaks at 24 hrs. Stays high 7-10 days.
- **CK-MB:** Rises at 4 hrs. Gone in **3 days**. (Use to diagnose **Re-infarction**).

5. KMU SCENARIOS (DIAGNOSIS)

Scenario 1: Pain at rest. ECG shows ST Depression. Trop is Negative.
Dx: Unstable Angina. (It's not NSTEMI because Trop is neg).

Scenario 2: Pain at rest. ECG shows ST Depression. Trop is POSITIVE.
Dx: NSTEMI.

Scenario 3: ST Elevation in II, III, aVF.
Dx: Inferior MI (RCA blocked).

ACS Management & Protocol

ER PROTOCOL • DRUGS • COMPLICATIONS **KMU - FINAL YEAR MBBS**

1. ACUTE MANAGEMENT (0-10 MINS)

"MONA" (But in the right order):
1. **A**spirin (300mg Chewed) → **Most important!**
2. **O**xygen (Only if Sats < 90%).
3. **N**itrates (Sublingual) for pain. *Check BP first!*
4. **M**orphine (If pain persists). *Caution in Hypotension/RV MI.*

\+ **P2Y12 Inhibitor:** Clopidogrel / Ticagrelor (Loading dose).
\+ **Anticoagulant:** Heparin (LMWH/Unfractionated).

2. REPERFUSION (OPEN THE ARTERY)

ONLY FOR STEMI! (Don't thrombolyse NSTEMI)

Option A: PCI (Angioplasty/Stent) - Gold Standard
• **Goal:** Door-to-Balloon time **< 90 Minutes**.

Option B: Thrombolysis (Streptokinase/tPA)
• Use if PCI is > 120 mins away.
• **Goal:** Door-to-Needle time **< 30 Minutes**.
• **Contraindications:** Previous Stroke (Hemorrhagic ever, Ischemic < 3mo), Active Bleeding, Aortic Dissection.

3. DISCHARGE MEDS (BASH)

Drug	Reason (The "Why")
Beta Blocker	Reduces O2 demand & Arrhythmia death.
ACE Inhibitor	Prevents Heart Remodeling (dilation).
Statin	Plaque Stabilization (High Dose).
Heparin/Antiplatelet	Prevents new clot.

4. COMPLICATIONS TIMELINE EXAM FAVORITE

Day 0 (First 24 hrs)
• **Arrhythmia (Ventricular Fibrillation)**.
• Most common cause of death before reaching hospital.

Day 1 - 3
• **Pericarditis** (Friction Rub, pain worse lying flat).

Day 3 - 7 (The "Rupture" Phase)
• Myocardium is softest/dead.
1. **Papillary Rupture:** New Mitral Regurg (Pulm Edema).
2. **Septal Rupture:** New VSD (Holosystolic Murmur).
3. **Free Wall Rupture:** Tamponade (Beck's Triad) → Death.

Week 2 - Months
• **Dressler's Syndrome:** Autoimmune Pericarditis (Fever + Pleuritic pain). Rx: NSAIDs.
• **Ventricular Aneurysm:** Persistent ST Elevation weeks later.

5. SPECIAL CONTRAINDICATIONS

1. Cocaine Chest Pain:
• **AVOID:** Beta Blockers (Unopposed Alpha → Worsens spasms).
• **USE:** Benzodiazepines.

2. Viagra (Sildenafil):
• **AVOID:** Nitrates for 24h (Severe Hypotension).

6. KMU SCENARIO BANK (MGMT)

Scenario 1 (KMU 2024):
Patient with NSTEMI. Should you give Thrombolytics (Streptokinase)?
Ans: NO! (Only for STEMI). Rx is Heparin/PCI.

Scenario 2 (KMU 2024):
4 weeks post-MI, fever + chest pain. Rub audible.
Dx: Dressler's Syndrome.

Heart Failure (Basics)

LEFT vs RIGHT • DIAGNOSIS **KMU - FINAL YEAR MBBS**

1. LEFT VS RIGHT HF (THE CONCEPT)

Left Sided Failure (L for Lungs):
The heart cannot pump blood OUT to the body, so it backs up into the **LUNGS**.
• **Key Symptom:** Pulmonary Edema (Breathlessness).

Right Sided Failure (R for Rest of Body):
The heart cannot pump blood TO the lungs, so it backs up into the **VEINS**.
• **Key Symptom:** Peripheral Edema (Swelling).

2. SYMPTOMS COMPARISON 5X REPEATED

Feature	Left Heart Failure	Right Heart Failure
Breathing	**Orthopnea** (Can't lie flat) **PND** (Wakes up gasping)	Usually normal breath (unless caused by Lung Dis.)
Chest Exam	**Bi-basal Crackles** (Fluid in alveoli)	Clear lungs (usually)
Neck	Normal JVP	**Raised JVP** (Kussmaul sign)
Body	Cold peripheries Fatigue (Low output)	**Pedal Edema** Ascites / Hepatomegaly

3. HIGH OUTPUT FAILURE 2X REPEATED

Concept: Heart is pumping *normal* amounts, but body demand is insane.
Causes (MAP):

- **M**etabolic: **Thyrotoxicosis**
- **A**nemia (Severe)
- **P**regnancy / Paget's Disease
- **B**eri-Beri (Thiamine deficiency - Wet)
- **A**V Fistula

4. NYHA CLASSIFICATION 6X REPEATED

Class I: No limitation. (Can run/climb).
Class II: Mild limitation. Comfortable at rest. (Breathless on **more than ordinary** activity).
Class III: Marked limitation. (Breathless on **less than ordinary** activity like brushing teeth).
Class IV: Dyspnea at **REST**.

5. PRECIPITATING FACTORS 3X REPEATED

FAILURE Mnemonic:
Forgot medication (Non-compliance) - *Most Common!*
Arrhythmia (A-Fib) / **A**nemia.
Ischemia / Infarction.
Lifestyle (Salt/Fluid excess).
Upregulation (Pregnancy/Thyroid).
Rheumatic / Renal failure.
Embolism (Pulmonary).

6. INVESTIGATIONS

Test	What to look for (MCQ Clue)
BNP	Best to **Rule Out** HF. If normal, HF is unlikely.
ECHO	**Gold Standard**. • **HFrEF:** EF < 40% (Systolic). • **HFpEF:** EF > 50% (Diastolic/Stiff heart).

🧠 **CXR BUZZWORDS (ABCDE):**
• **A**lveolar Edema ("Bat wings").
• **B**-lines (Kerley B = Interstitial edema).
• **C**ardiomegaly.
• **D**ilated Upper Lobes (Cephalization).
• **E**ffusion (Pleural).

LOGO

HF Management & Scenarios

DRUGS • MORTALITY • EXAM TRAPS **KMU - FINAL YEAR MBBS**

🚨 **ACUTE LVF (PULMONARY EDEMA)**
"Patient gasping, pink frothy sputum"
L-M-N-O-P
• Lasix (IV Furosemide) - First Line!
• Morphine (Reduces anxiety/preload)
• Nitrates (Unless Hypotensive)
• Oxygen (Sit them up!)
• Position (Propped up)

1. CHRONIC DRUGS: THE MORTALITY LIST 8X REPEATED

Group A: Improves Survival (Give to Everyone)
1. **ACE Inhibitors** (Ramipril/Enalapril).
2. **Beta Blockers** (Bisoprolol/Metoprolol/Carvedilol).
3. **Spironolactone** (Aldosterone Antagonist).
4. **SGLT2 Inhibitors** (Dapagliflozin/Empagliflozin).
5. **Sacubitril/Valsartan** (ARNI).

Group B: Symptom Relief ONLY (NO Mortality Benefit)
1. **Diuretics** (Furosemide).
2. **Digoxin** (Reduces hospitalizations only).

2. DRUG SIDE EFFECTS 4X REPEATED

Drug	Side Effect (The MCQ Answer)
ACE Inhibitors	**Cough** (Bradykinin), **Angioedema**, Hyperkalemia.
Spironolactone	**Gynecomastia** (Painful breast in male).
Furosemide	Hypokalemia, Gout (Hyperuricemia).
Digoxin	Yellow vision, Arrhythmia, Vomiting.
Beta Blockers	Bradycardia, Bronchospasm (Avoid in Asthma!).

3. KMU SCENARIO BANK (REAL QUESTIONS)

Scenario 1 (KMU 2024):
60F with MI history, SOB lying flat (Orthopnea). Raised JVP, Pedal Edema, Bilateral Crepitations.
Diagnosis: Congestive Heart Failure (Biventricular).
Clue: Orthopnea = Left. Edema = Right. Combined = CCF.

Scenario 2 (KMU 2024):
60M with gynecomastia (breast enlargement). He is on heart failure meds.
Culprit Drug: Spironolactone.

Scenario 3 (KMU 2024):
70M with HF and COPD. Sats 85%. Arterial gas shows CO2 retention (Type 2 Failure).
Management: NIV (BiPAP) or Controlled Oxygen via Venturi. (Avoid high flow O2).

4. THE "CONTRAINDICATION" TRAP

Q: Which drug should NOT be used in HF?
👉 **Calcium Channel Blockers (Verapamil/Diltiazem).** They depress the heart.
👉 **NSAIDS.** They retain fluid.

5. SPECIAL: DIGOXIN TOXICITY HIGH YIELD

Signs: Yellow/Green vision (Xanthopsia), Nausea, Arrhythmia.
Precipitated by: Hypokalemia (Check K+ levels!).
ECG Sign: "Reverse Tick" sign (Scooped ST segment).
Rx: Digibind (Antibodies).

Acute Rheumatic Fever (ARF)

CRITERIA • DIAGNOSIS • PROPHYLAXIS **KMU - FINAL YEAR MBBS**

1. THE ETIOLOGY

Cause: Group A Beta-Hemolytic Streptococcus (GABHS).
- **Site:** ONLY follows **Pharyngitis** (Sore throat).
- **Timing:** 2-3 weeks after infection.
- **Mechanism:** Molecular Mimicry (Antibodies against Strep attack heart valves).

**Note: Skin infections (Impetigo) cause Glomerulonephritis, NOT Rheumatic Fever!*

2. DIAGNOSIS (THE JONES CRITERIA) REPEATED 6X

Diagnosis Rule:
Evidence of Strep (ASO Titer / Culture)
PLUS
2 MAJOR Criteria **OR** 1 Major + 2 Minor.

MAJOR CRITERIA (J-O-N-E-S)
J = **Joints** (Migratory Polyarthritis). *Most common symptom (75%).*
O = ♡ (Carditis - Pancarditis). *Most serious.*
N = **Nodules** (Subcutaneous, painless, extensor surfaces).
E = **Erythema Marginatum** (Serpentine rash, spares face).
S = **Sydenham Chorea** (St. Vitus Dance - jerking movements).

Minor Criteria (FAPE)
- **F**ever.
- **A**rthralgia (Joint pain without swelling).
- **P**rolonged PR Interval (First degree block).
- **E**levated ESR / CRP.

3. MANAGEMENT STRATEGY

Step 1: Eradicate Strep
- IM Benzathine Penicillin G (Single dose).
- *Allergic?* Erythromycin / Azithromycin.

Step 2: Anti-Inflammatory
- **Arthritis only?** High dose **Aspirin**.
- **Severe Carditis? Corticosteroids** (Prednisolone).

Step 3: Chorea
- Self-limiting. If severe, use **Haloperidol** or Valproate.

4. PROPHYLAXIS DURATION VERY HIGH YIELD

How long to give Penicillin injections (every 4 weeks)?
1. RF without Carditis:
For 5 years OR until age 21 (whichever is longer).

2. RF with Carditis (No Valve Damage):
For 10 years OR until age 21 (whichever is longer).

3. RF with Valve Damage (Residual Disease):
For 10 years OR until **age 40** (whichever is longer).
**Some guidelines say Lifelong for severe valve disease.*

5. KMU EXAM SCENARIOS

Scenario: 12yo boy, sore throat 3 weeks ago. Now has jerky movements of hands and emotional lability.
Dx: Sydenham Chorea (Rheumatic Fever).
Exam Finding: "Milkmaid's Grip" or "Jack-in-the-box" tongue.

Valvular Heart Disease

MURMURS • STENOSIS • REGURGITATION **KMU - FINAL YEAR MBBS**

1. MITRAL STENOSIS (MS)

Cause: Rheumatic Fever (Almost 100% of cases).
Pathophysiology: LA pressure ↑ → Pulmonary HTN → RV Failure.
Key Signs (The Triad):
1. **Loud S1** (Tapping Apex Beat).
2. **Opening Snap** (After S2).
3. **Mid-Diastolic Murmur** (Rumbling, Apex, Left lateral).
- **Malar Flush** (Plum-colored cheeks).
- **Complication:** Atrial Fibrillation (Dilated LA).

2. MITRAL REGURGITATION (MR)

Signs:
- **Murmur: Pan-Systolic** (Holosystolic).
- **Radiation:** To the **Axilla**.
- **Apex Beat:** Displaced & Thrusting (Volume overload).

Acute vs Chronic:
- **Acute:** Papillary rupture (Post-MI). Pulmonary Edema.
- **Chronic:** MVP or Rheumatic. Tolerated for years.

3. MITRAL VALVE PROLAPSE (MVP)

The "Clicky" Murmur
- **Patient:** Young female, thin, anxious.
- **Sign: Mid-Systolic Click** followed by late systolic murmur.
- **Dynamic:** Murmur gets *longer*/click comes *earlier* on standing (Decreased preload).

4. AORTIC STENOSIS (AS) HIGH YIELD

Causes: Calcification (Old age) or Bicuspid Valve (Younger).
Symptoms (SAD Triad):
1. **S**yncope (Exertional).
2. **A**ngina.
3. **D**yspnea (HF) → Worst prognosis (2 years survival).

Signs:
- **Pulse:** Slow rising (Pulsus Parvus et Tardus).
- **Murmur: Ejection Systolic** (Crescendo-Decrescendo).
- **Radiation:** To the **Carotids** (Neck).

5. AORTIC REGURGITATION (AR)

Causes: Hypertension, Marfan's, Syphilis, Rheumatic.
Signs (The "Leaky" Valve):
- **Pulse: Collapsing / Water-Hammer Pulse**.
- **BP: Wide Pulse Pressure** (e.g., 160/50).
- **Murmur: Early Diastolic** (Decrescendo) at Left Sternal Edge.
- **De Musset Sign:** Head bobbing with heartbeat.

6. TRICUSPID REGURGITATION (TR)

How to distinguish TR from MR?
Both are Pan-Systolic.
Carvallo's Sign: TR murmur gets **LOUDER on Inspiration**. (Right sided murmurs increase with Inspiration).
JVP: Giant V-waves in TR.

7. MANAGEMENT SUMMARY

Lesion	Intervention Criteria
Mitral Stenosis	**Balloon Valvuloplasty** if pliable. Replace if calcified.
Aortic Stenosis	**Replace Valve** if Symptomatic (SAD) or Gradient > 40mmHg.
Regurgitations	Replace before LV function drops (EF < 60% or LV dilation).

Infective Endocarditis

DUKE CRITERIA • ORGANISMS • SIGNS **KMU - FINAL YEAR MBBS**

1. THE "ORGANISM-PATIENT" MATCH

Examiners love to ask "Most Likely Organism":

1. Staph Aureus (Most Common Overall):
- **Patient: IV Drug User** (Tricuspid Valve), Acute presentation, High Fever.
- **Valve:** Native Healthy Valve or Tricuspid.

2. Strep Viridans (Sub-Acute):
- **Patient:** Poor dental hygiene or **Dental Procedure**.
- **Valve: Damaged/Prosthetic Valves** (Mitral/Aortic).

3. Staph Epidermidis:
- **Patient: Prosthetic Valve** (Early infection < 2 months post-op).

4. Strep Bovis (Gallolyticus):
- **Patient:** Underlying **Colon Cancer** or Polyps.

2. DUKE CRITERIA (KMU 2024 FAVORITE)

Diagnosis = 2 Major OR 1 Major + 3 Minor OR 5 Minor

MAJOR CRITERIA (The Big Guns)
1. **Positive Blood Culture** (Typical organism in 2 separate cultures).
2. **Endocardial Involvement** (Vegetation on Echo).
3. **NEW Valvular Regurgitation** (Note: "Worsening" murmur is NOT major, must be NEW regurgitation).

MINOR CRITERIA
- Predisposition (Heart condition, IV Drug use).
- Fever (> 38°C).
- Vascular phenomena (Janeway, Emboli).
- Immunologic phenomena (Osler, Roth spots).
- Microbiological evidence (Not meeting major).

3. CLINICAL SIGNS (THE "HAND" EXAM)

"FROM JANE" Mnemonic:
- **F**ever (Most common).
- **R**oth Spots (Retinal hemorrhage with pale center).
- **O**sler Nodes (**Ouch!** Painful nodules on finger pulps - Immune complex).
- **M**urmur (New Regurgitation).
- **J**aneway Lesions (**Painless** red spots on palms/soles - Embolic).
- **A**nemia.
- **N**ail Hemorrhage (Splinter hemorrhage).
- **E**mboli (Stroke, Pulmonary Embolism).

4. KMU EXAM SCENARIOS

Scenario 1 (KMU 2023):
Patient with fever, fatigue. Blood culture: **Strep Viridans**.
Q: Which finding supports IE diagnosis?
Ans: New Valvular Regurgitation (Major Criterion).
(Examiner will distract you with "Splinter hemorrhages" which are Minor).

Scenario 2 (KMU 2024):
IV Drug User. High fever. Murmur.
Organism: Staph Aureus.
Valve: Tricuspid Valve (Right sided IE).

Scenario 3 (KMU 2023):
Patient with prosthetic valve surgery 1 month ago. Fever.
Organism: Staph Epidermidis.

5. MANAGEMENT & PROPHYLAXIS

Empiric Treatment:
- **Vancomycin + Gentamicin** (Covers MRSA + Gram Neg).

Antibiotic Prophylaxis (Who needs it?):
- **High Risk ONLY:** Prosthetic valve, Previous IE, Unrepaired Cyanotic CHD.
- **Procedure:** Dental procedures (involving gingiva).
- **Drug: Amoxicillin 2g PO** (1 hr before).
- *(Penicillin Allergy? Use Clindamycin).*

Cardiomyopathies (CMP)

HOCM • DILATED • RESTRICTIVE **KMU - FINAL YEAR MBBS**

1. THE "BIG THREE" COMPARISON

Type	Pathology	Ejection Fraction
Dilated (Most Common)	"Big, Floppy Heart" Eccentric Hypertrophy. **Systolic Failure**.	**Reduced** (< 40%)
Hypertrophic (HOCM)	"Thick, Muscular Heart" Septal Hypertrophy. **Diastolic Failure**.	**Normal** or High (> 60%)
Restrictive (Rare)	"Stiff, Rigid Heart" Infiltration. **Diastolic Failure**.	**Normal** (But stiff)

2. HOCM (HYPERTROPHIC OBSTRUCTIVE) #1 EXAM TOPIC

Typical Patient:
- **Young Athlete** (Footballer/Cricketer) who **collapses/dies suddenly** during sports.
- **Family History:** Positive for sudden death (Autosomal Dominant).

Signs:
- **Murmur:** Ejection Systolic at Left Sternal Edge.
- **Pulse:** Jerky / Bisferiens Pulse (Double peak).
- **ECG:** Deep Q waves ("Dagger like"), LVH.

🛑 **THE MURMUR TRAP (Must Know!)**
HOCM Murmur gets **LOUDER** with:
- **Standing** (Less venous return $\rightarrow$ Smaller LV $\rightarrow$ More Obstruction).
- **Valsalva** (Strain).

HOCM Murmur gets **SOFTER** with:
- **Squatting** (More venous return $\rightarrow$ Bigger LV $\rightarrow$ Less Obstruction).
- **Handgrip**.

(This is the exact OPPOSITE of Aortic Stenosis!)

3. HOCM MANAGEMENT

1. Drugs (Relax the heart):
- **Beta Blockers** (Metoprolol) - First Line.
- **CCBs** (Verapamil).

2. CONTRAINDICATED (Avoid!):
- **Digoxin, Nitrates, Diuretics.**
- *Why?* They increase contractility or decrease size, worsening the obstruction!

3. Prevention: ICD (Defibrillator) for high risk.

4. DILATED CARDIOMYOPATHY (DCM)

Causes (The "ABCD" Mnemonic):
- **A**lcohol / **A**driamycin (Doxorubicin).
- **B**eri-Beri (Wet - Thiamine Def).
- **C**oxsackie B Virus (Myocarditis history).
- **C**hagas Disease / **C**ocaine.
- **D**iabetes / **P**regnancy (Peripartum).

Clinical Features:
- Signs of Heart Failure (S3 Gallop, Displaced Apex, Edema).
- **Rx:** Same as Heart Failure (ACEi, BB, Spironolactone).

5. PERIPARTUM CARDIOMYOPATHY KMU SCENARIO

Scenario: 25yo Female. 1-5 months **Post-Partum** (after delivery).
Complaint: Breathlessness (Orthopnea), Swelling.
Diagnosis: Dilated Cardiomyopathy (Peripartum).
Rx: Standard HF meds. *Warning: High risk of recurrence in next pregnancy.*

6. RESTRICTIVE CARDIOMYOPATHY

Causes (The Infiltrators):
1. **Amyloidosis** (Apple-green birefringence).
2. **Sarcoidosis**.
3. **Hemochromatosis** (Bronze Diabetes).

Signs:
- **Kussmaul's Sign:** JVP *rises* on inspiration (Stiff heart can't accept blood).
- Mimics Constrictive Pericarditis.

7. TAKOTSUBO (BROKEN HEART)

Scenario: Post-menopausal woman. Severe emotional stress (Husband died/Argument).
Signs: Chest pain, ST Elevation (Mimics STEMI).
Angio: Clean Coronaries (No block).
Echo: "Apical Ballooning".

8. KMU PAST PAPER BANK

Q1 (KMU 2024): 26yo Football player collapsed. Uncle died suddenly. Murmur increased on standing.
Ans: Hypertrophic Obstructive Cardiomyopathy (HOCM).

Q2 (KMU 2024): 23yo female, 2 months after delivery, presents with orthopnea and edema.
Ans: Peripartum Cardiomyopathy.

Cardiac Arrest & Torsades

ACLS • VF/VT • TORSADES **KMU - FINAL YEAR MBBS**

1. THE SHOCKABLE RHYTHMS (VF & VT)

1. Ventricular Fibrillation (VF):
- **ECG:** Chaotic, irregular, wavy line. "Bag of worms". No identifiable QRS.
- **Physiology:** Ventricle is quivering. No Output.
- **Cause: Ischemia (MI)** is #1 cause.

2. Pulseless VT (pVT):
- **ECG:** Wide QRS, Regular, Fast (>100).
- **Clinical:** Patient has **NO PULSE**.
- *Note: If they have a pulse, it's NOT cardiac arrest.*

2. THE "SHOCK VS CARDIOVERT" TRAP

THIS IS THE MOST COMMON EXAM ERROR!

1. Defibrillation (Unsynchronized Shock):
- **Use for:** VF and **Pulseless** VT.
- **Why:** There is no R-wave to synchronize to! Just shock ASAP.

2. Cardioversion (Synchronized):
- **Use for:** VT **with a Pulse** (Unstable), SVT, AFib.
- **Why:** Machine times the shock to avoid the T-wave (R-on-T phenomenon causes VF).

3. TORSADES DE POINTES (TWISTING OF POINTS)

Definition: Polymorphic VT with a **Long QT Interval**.
ECG: QRS gets big, then small, then big (twisting around baseline).
Causes (Pointes):
- **P**henothiazines / Psych meds.
- **O**ther meds (Macrolides, Ondansetron).
- **I**ntracranial Bleed.
- **N**o nutrition (Anorexia/Hypokalemia).
- **T**ic (Genetic Long QT).
- **E**lectrolytes (**Low Mg+**, Low K+, Low Ca+).

🚨 **ACLS ALGORITHM (SHOCKABLE)**
"Shock - CPR - Shock - CPR - Drug"

1. Start CPR + Give Oxygen.
2. Rhythm Check: VF/pVT?
👇
3. SHOCK #1 (Biphasic 120-200J).
4. CPR (2 mins) - IV Access.
👇
5. SHOCK #2.
6. CPR (2 mins) + EPINEPHRINE 1mg.
👇
7. SHOCK #3.
8. CPR (2 mins) + AMIODARONE 300mg.

4. DRUGS IN CARDIAC ARREST

Drug	Dose & Indication
Epinephrine	**1mg IV** every 3-5 mins. Vasoconstrictor (Increases flow to heart/brain).
Amiodarone	**300mg IV Bolus** (1st dose). **150mg IV** (2nd dose). Give **AFTER 3rd Shock**.
Magnesium Sulfate	**2g IV Push**. **ONLY for Torsades de Pointes.** **Do not give for regular VT.**

5. REVERSIBLE CAUSES (H'S & T'S)

The 5 H's
- **H**ypovolemia (Fluids).
- **H**ypoxia (Oxygen).
- **H**ydrogen Ion (Acidosis -> Bicarb).
- **H**ypo/Hyperkalemia.
- **H**ypothermia.

The 5 T's
- **T**ension Pneumothorax (Needle Decompression).
- **T**amponade (Pericardiocentesis).
- **T**oxins (Drug OD).
- **T**hrombosis (Pulmonary - PE).
- **T**hrombosis (Coronary - MI).

6. KMU SCENARIO BANK

Scenario 1:
Patient collapses. Monitor shows wide irregular rhythm. No pulse.
Action: Defibrillation (Unsynchronized).

Scenario 2:
Patient on Macrolides/Anti-psychotics collapses. ECG shows twisting QRS.
Action: IV Magnesium Sulfate (Not Amiodarone! Amio prolongs QT further).

Scenario 3:
Post-MI patient dies immediately in ambulance.
Cause: Ventricular Fibrillation (VF).

Diseases of Pericardium

TAMPONADE • CONSTRICTIVE • EFFUSION **KMU - FINAL YEAR MBBS**

1. ACUTE PERICARDITIS

Symptoms:
- **Pain:** Pleuritic (Sharp), Retro-sternal.
- **Relieving Factor: Sitting Up & Leaning Forward** (Classic MCQ Clue).
- **Worsening Factor:** Lying flat (Recumbent) or Inspiration.

Signs & Diagnosis:
- **Friction Rub:** "Scratchy" sound (like walking on snow). Best heard at Left Sternal Border.
- **ECG:** Diffuse **Concave ST Elevation** ("Happy Face") + **PR Depression** (Very Specific).

Treatment:
- **First Line: NSAIDs** (Aspirin/Ibuprofen) + **Colchicine** (to prevent recurrence).
- **Avoid:** Steroids (Increases recurrence rate) unless refractory.

2. PERICARDIAL EFFUSION

Concept: Fluid accumulates. If slow = Heart stretches. If fast = Tamponade.
- **Causes:** Uremia, TB (Common in our region), Malignancy (Breast/Lung), Hypothyroidism.
- **ECG Sign: Low Voltage** QRS Complexes.
- **Diagnostic Test:** Echocardiography (Echo-free space around heart).

3. CARDIAC TAMPONADE EMERGENCY

Pathophysiology: Fluid crushes the heart -> Diastolic Collapse of Right Ventricle -> No Filling -> No Output.

BECK'S TRIAD (The Classic Signs):
1. **Hypotension** (Low BP - Shock).
2. **Muffled Heart Sounds** (Distant/Quiet).
3. **Distended Neck Veins** (Raised JVP with prominent x-descent).

4. TAMPONADE: DIAGNOSIS & RX

Clinical Sign: Pulsus Paradoxus
- SBP drops > 10mmHg during **Inspiration**.
- *(Why? Septum bulges into LV during inspiration, killing LV filling).*

ECG Sign (Gold): Electrical Alternans
- QRS height changes beat-to-beat (Heart swinging in fluid).

Management:
- **Immediate: Pericardiocentesis** (Needle drainage).
- **Supportive:** IV Fluids (Keep preload high!).
- **CONTRAINDICATED: Diuretics** (They reduce preload -> Cardiac Arrest).

5. CONSTRICTIVE PERICARDITIS

Concept: Pericardium becomes a rigid, calcified shell. Heart cannot expand.
- **Primary Cause (KMU): Tuberculosis (TB)**.
- **Signs:** Ascites (out of proportion to edema), Hepatomegaly.
- **Sound: Pericardial Knock** (Early diastole).
- **X-Ray:** Calcified Pericardial Ring.
- **Treatment:** Pericardiectomy (Surgical stripping).

6. THE "CONFUSION" TABLE

How to tell them apart in MCQs?

Pulsus Paradoxus?
- Tamponade: **YES** (Classic).
- Constrictive: No (or mild).

Kussmaul's Sign? (JVP rises on Inspiration)
- Tamponade: **NO**.
- Constrictive: **YES** (Classic).

Heart Sounds?
- Tamponade: Muffled.
- Constrictive: Pericardial Knock.

7. KMU SCENARIO BANK

Scenario 1 (Trauma):
Stab wound chest. BP 80/50. JVP raised. Breath sounds normal (Rules out Tension Pneumothorax).
Diagnosis: Cardiac Tamponade.

Scenario 2 (Malignancy):
Lung cancer patient. Dyspnea. ECG shows swinging QRS sizes (Alternans).
Diagnosis: Malignant Effusion/Tamponade.

Hypertension (HTN)

GUIDELINES • DRUG CHOICE • EMERGENCIES **KMU - FINAL YEAR MBBS**

1. DEFINITION & TARGETS

Diagnosis:
BP ≥ **140/90 mmHg** (Clinic) on 2-3 occasions.
**Note: Home BP monitoring is more accurate (Cutoff ≥ 135/85).*

Target BP (The "Goal"):
- General Population: **< 140/90**.
- Diabetic / Renal / CAD: **< 130/80**.
- Elderly (>80y): **< 150/90** (Avoid falls).

2. THE DRUG RULES (A / C / D)

Step 1: Patient Age & Ethnicity

Group 1: Age < 55 OR Diabetic (Any age)
→ Start **"A"** (ACE Inhibitor or ARB).
**Reason: High Renin State.*

Group 2: Age ≥ 55 OR Black/Afro-Caribbean
→ Start **"C"** (Calcium Channel Blocker) or **"D"** (Diuretic).
**Reason: Low Renin State (Salt sensitive).*

3. SPECIAL SCENARIOS (KMU FAVORITE)

Patient Type	Drug of Choice
Pregnancy	**Labetalol** or Methyldopa. **Never give ACE/ARB (Teratogenic).*
Diabetes	**ACE Inhibitor** (Ramipril). **Protects Kidneys (Renoprotective).*
Benign Prostatic Hyperplasia (BPH)	**Alpha Blocker** (Doxazosin). **Treats both BP and Urinary symptoms.*
Gout	**Losartan** (Lowers Uric Acid). **Avoid Thiazides (Worsens Gout).*

4. SECONDARY HYPERTENSION

When to suspect?
- Young patient (< 35y).
- Resistant HTN (3 drugs not working).

Common Causes (ROPE):
1. **R**enal Artery Stenosis (Bruit, Cr rises after ACEi).
2. **O**bstructive Sleep Apnea (Snoring, Obesity).
3. **P**heochromocytoma (Palpitations, Sweat, Headache).
4. **E**ndocrine (Conn's / Cushing's).

5. CONN'S SYNDROME (HYPERALDOSTERONISM)

Classic MCQ Triad:
1. **Hypertension** (High).
2. **Hypokalemia** (Low Potassium).
3. **Hypernatremia** (High Sodium - mild).

Rx: Spironolactone.

6. HYPERTENSIVE CRISIS

Emergency vs. Urgency (BP usually > 180/120)

1. Emergency: End Organ Damage IS present.
- Encephalopathy, MI, Pulmonary Edema, Retinal Hemorrhage.
- **Rx: IV Labetalol** or **IV Sodium Nitroprusside**.
- *Goal:* Lower BP by max 25% in 1st hour (Don't drop too fast → Stroke!).

2. Urgency: NO End Organ Damage.
- **Rx:** Oral Meds (Amlodipine/Captopril). Send home.

7. KMU SCENARIO BANK

Scenario 1 :
African Black male with BP 160/90. Best initial drug?
Ans: CCB (Amlodipine). (Black patients respond poorly to ACEi).

Scenario 2 :
Pregnant lady (30 weeks), BP 150/90. Urine protein 1+.
Diagnosis: Pre-Eclampsia.
Rx: Labetalol (Safe).

Scenario 3 :
Patient started on ACE Inhibitor. 1 week later, Creatinine doubles.
Diagnosis: Bilateral Renal Artery Stenosis.
(ACEi removes the efferent constriction that was keeping the kidney alive).