MEDICAL EDUCATION RESOURCE

Clinicoanatomical Problems

Clinicoanatomical Problems — Pericardium, Heart, and Foetal Circulation

1. Cardiac Tamponade

- **Cause:** Rapid accumulation of fluid (blood, pus, or effusion) in the **pericardial cavity**.
- **Effect:** Compression of the heart ? prevents full ventricular filling ? decreased cardiac output.
- **Clinical Signs:**
  - Distended neck veins (? venous pressure)
  - Hypotension
  - Muffled heart sounds (**Beck's triad**)
- **Treatment:** Emergency **pericardiocentesis** (needle inserted at left 5th intercostal space near sternum).

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2. Pericarditis

- **Definition:** Inflammation of the pericardium (viral, bacterial, or post-MI).
- **Symptoms:** Sharp, substernal pain relieved by leaning forward.
- **Finding: Pericardial friction rub** on auscultation due to roughened pericardial layers.

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3. Myocardial Infarction (MI)

- **Cause:** Complete blockage of a coronary artery (most often **LAD**).
- **Pathophysiology:** Ischemia ? necrosis of myocardial tissue.
- **ECG Changes:** ST elevation, pathological Q wave, inverted T wave.
- **Clinical Feature:** Severe crushing chest pain radiating to **left arm, neck, or jaw**.

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4. Angina Pectoris

- **Cause:** Transient myocardial ischemia without necrosis due to coronary artery narrowing.
- **Symptoms:** Tightness or heaviness in chest on exertion, relieved by **rest or nitrates**.

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5. Coronary Artery Dominance and MI

- **Right dominance:** RCA supplies posterior septum ? occlusion causes **inferior wall infarction**.
- **Left dominance:** LCX supplies posterior septum ? infarction may involve most of **left ventricle**.
- **Co-dominance:** Lesser extent of infarction due to collateral flow.

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6. Atrial Septal Defect (ASD)

- **Cause:** Incomplete closure of **foramen ovale** due to failure of **septum primum and secundum fusion**.

- **Effect:** Left-to-right shunt ? right atrial and ventricular dilation.
- **Clinical Sign:** Fixed splitting of **second heart sound (S?)**.

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7. Ventricular Septal Defect (VSD)

- **Cause:** Defective **membranous part** of interventricular septum (commonest congenital cardiac defect).
- **Effect:** Left-to-right shunt ? pulmonary hypertension ? right ventricular hypertrophy.
- **Complication:** Eisenmenger's syndrome (reversal of shunt ? cyanosis).

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8. Patent Ductus Arteriosus (PDA)

- **Cause:** Persistence of **ductus arteriosus** after birth.
- **Effect:** Blood flows from **aorta ? pulmonary artery** (left-to-right shunt).
- **Clinical Feature:** Continuous **"machinery" murmur** at left 2nd intercostal space.
- **Treatment:** Indomethacin (to close PDA) or surgical ligation.

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9. Tetralogy of Fallot

- **Components (PROV):**
  - **P** – Pulmonary stenosis
  - **R** – Right ventricular hypertrophy

    - **O** – Overriding aorta
    - **V** – Ventricular septal defect
- **Effect:** Right-to-left shunt ? **cyanosis** and **clubbing**.
- **Clinical Sign:** Squatting improves symptoms by increasing systemic resistance.

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10. Transposition of Great Arteries

- **Cause:** Failure of spiral rotation of **aorticopulmonary septum**.
- **Effect:** Aorta arises from right ventricle; pulmonary trunk from left ventricle.
- **Consequence:** Parallel circulation incompatible with life unless shunts (ASD, PDA) persist.

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11. Coarctation of Aorta

- **Cause:** Constriction of aortic lumen near ductus arteriosus.
- **Types:**
    - *Pre-ductal:* Ductus arteriosus remains patent (in infancy).
    - *Post-ductal:* Collateral circulation via intercostal arteries (adult type).
- **Clinical Sign:**
    - Weak femoral pulses

- Radio-femoral delay
- Rib notching on X-ray (due to enlarged intercostal arteries).

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12. Referred Cardiac Pain

- **Mechanism:** Visceral pain from myocardium transmitted via **T1–T5 spinal nerves**.
- **Perception:** Left chest, shoulder, medial arm, and neck — same dermatomes as cardiac afferents.

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13. Arrhythmias

- **Cause:** Disturbances in conduction pathway (SA, AV, or Purkinje system).
- **Types:**
  - Tachycardia (? rate)
  - Bradycardia (? rate)
  - Heart block (AV conduction failure)
- **Treatment:** Pacemaker for complete block.

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14. Cyanotic vs. Acyanotic Heart Disease

- **Cyanotic:** Right-to-left shunt ? decreased oxygenation (e.g., Tetralogy, Transposition).
- **Acyanotic:** Left-to-right shunt ? pulmonary overload (e.g., ASD, VSD, PDA).

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15. Pericardial Effusion after MI

- **Mechanism:** Post-infarction inflammation (**Dressler's syndrome**) ? pericarditis ? fluid accumulation.
- **Symptoms:** Low-grade fever, chest pain, friction rub, pericardial thickening.

Additional Clinicoanatomical Problems — Pericardium, Heart, and Foetal Circulation

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16. Constrictive Pericarditis

- **Cause:** Chronic inflammation leading to **fibrosis and calcification** of pericardium (e.g., post-tubercular).
- **Effect:** Rigid pericardium restricts diastolic filling ? **right-sided heart failure**.
- **Clinical Features:**
  - Elevated jugular venous pressure (JVP)
  - Ascites and pedal edema
  - Kussmaul's sign (rise of JVP during inspiration)
- **Treatment: Pericardiectomy** (surgical removal of pericardium).

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17. Endocarditis

- **Cause:** Infection of **endocardial surface** (commonly valves) by bacteria like *Streptococcus viridans*.

- **Types:**
  - *Acute*: Rapid and destructive (Staph. aureus).
  - *Subacute*: Slow and less aggressive.
- **Clinical Features:**
  - Fever, murmur, splinter hemorrhages, Osler’s nodes.
  - Commonly affects **mitral valve**.
- **Complication:** Embolic infarcts in brain, spleen, or kidneys.

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18. Rheumatic Heart Disease

- **Cause:** Autoimmune reaction to *Streptococcus pyogenes* throat infection.
- **Result:** Chronic inflammation and scarring of heart valves (especially **mitral valve**).
- **Clinical Features:**
  - Mitral stenosis or regurgitation
  - Opening snap and diastolic murmur
  - “Fish-mouth” deformity of mitral orifice.

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19. Mitral Valve Prolapse (MVP)

- **Cause:** Redundant valve leaflets bulge into left atrium during systole.

- **Clinical Features:**
  - Mid-systolic click followed by late systolic murmur.
  - May cause palpitations or endocarditis.
- **Common in:** Young women with connective tissue disorders (e.g., Marfan syndrome).

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20. Aortic Stenosis

- **Cause:** Calcification of aortic valve cusps in elderly or congenital bicuspid valve.
- **Effect:** Left ventricular hypertrophy due to pressure overload.
- **Symptoms:** Dyspnea, angina, syncope on exertion.
- **Murmur:** Harsh systolic murmur radiating to carotids.

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21. Aortic Regurgitation

- **Cause:** Incomplete closure of aortic valve (post-rheumatic, infective endocarditis).
- **Effect:** Backflow of blood into left ventricle ? dilatation and hypertrophy.
- **Clinical Signs:**
  - “Water hammer” pulse (Corrigan’s pulse).
  - Early diastolic murmur.

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22. Mitral Stenosis

- **Cause:** Post-rheumatic fibrosis causing narrowing of mitral orifice.
- **Effect:** Left atrial pressure ? ? pulmonary congestion ? right heart failure.
- **Symptoms:** Dyspnea, hemoptysis, orthopnea.
- **Murmur:** Diastolic, low-pitched “rumbling” murmur at apex.

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23. Myocarditis

- **Cause:** Viral infection (e.g., Coxsackie B virus).
- **Effect:** Inflammation of myocardium ? reduced contractility ? heart failure.
- **Clinical Features:** Fever, palpitations, arrhythmias, chest pain.

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24. Congestive Cardiac Failure (CCF)

- **Left-sided failure:** Pulmonary congestion, dyspnea, orthopnea.
- **Right-sided failure:** Systemic venous congestion, ascites, ankle edema.
- **Common Causes:**
    - Hypertension
    - Ischemic heart disease
    - Valvular disorders

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25. Sudden Cardiac Death (SCD)

- **Mechanism:** Fatal arrhythmia (ventricular fibrillation) often following acute myocardial ischemia.
- **Common Cause:** Coronary artery thrombosis or severe atherosclerosis.
- **Prevention:** Early reperfusion therapy and defibrillation.

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26. Coarctation of Aorta (Adult Type)

- **Mechanism:** Constriction distal to origin of left subclavian artery.
- **Features:**
  - Hypertension in upper limbs
  - Weak pulses in lower limbs
  - “Rib notching” on X-ray (collateral flow via intercostal arteries).

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27. Dextrocardia

- **Definition:** Heart positioned on right side due to **reverse rotation** during embryogenesis.
- **Variants:**
  - *Isolated*: Only heart is reversed.
  - *With situs inversus*: All organs reversed.
- **Clinical Relevance:** Often asymptomatic unless associated with other defects (Kartagener syndrome).

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28. Eisenmenger’s Syndrome

- **Pathogenesis:** Long-standing left-to-right shunt (ASD, VSD, PDA) ? pulmonary hypertension ? reversal to right-to-left shunt.
- **Result: Cyanosis**, **clubbing**, and **polycythemia**.

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29. Persistent Truncus Arteriosus

- **Cause:** Failure of **aorticopulmonary septum** to form.
- **Result:** Common arterial trunk supplying both systemic and pulmonary circulations ? **cyanosis**.

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30. Double Outlet Right Ventricle

- **Anomaly:** Both aorta and pulmonary trunk arise from right ventricle.
- **Effect:** Severe cyanosis; survival depends on VSD allowing mixing of blood.

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31. Sinus Venosus Defect

- **Cause:** Abnormal communication between **right pulmonary vein** and **right atrium**.
- **Result:** Oxygenated blood enters right atrium ? mild cyanosis and dyspnea.

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32. Persistent Left Superior Vena Cava

- **Cause:** Failure of left cardinal vein to regress.

- **Drainage:** Opens into **coronary sinus** instead of right atrium.
- **Clinical Importance:** Important during **central venous catheterization** or **pacemaker insertion**.

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33. Congenital Absence of Pericardium

- **Rare anomaly** due to faulty pleuropericardial membrane fusion.
- **Clinical Presentation:** Asymptomatic or with displaced heart shadow on X-ray.
- **Risk:** Cardiac herniation in partial defects.

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34. Cardiac Hypertrophy

- **Cause:** Pressure or volume overload (hypertension, valvular disease).
- **Types:**
  - *Concentric:* Due to pressure overload (e.g., aortic stenosis).
  - *Eccentric:* Due to volume overload (e.g., aortic regurgitation).
- **Complication:** Decreased compliance and arrhythmia risk.

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35. Coronary Artery Spasm (Variant or Prinzmetal Angina)

- **Mechanism:** Transient vasospasm of coronary artery ? ischemia without atherosclerosis.
- **Feature:** Chest pain at rest with **ST elevation** on ECG, relieved by nitrates.