TOPIC :- HEART FAILURE

* IM 1.15 :- Identify and describe the timing, pitch, quality, conduction and significance of precordial murmurs and their variations.

PRECORDIAL MURMURS

* murmurs are sounds produced by turbulent blood flow in the heart or great vessels. They are categorized based on their timings, pitch, quality, location, radiation (conduction) and associated findings.

1. TIMING

* Refers to when murmur occurs during the cardiac cycle :-

→ Systolic murmurs :- occur between S_1 (first heart sound) and S_2 (second heart sound)

(i) Ejection systolic murmurs :-
- Start after S_1 and end before S_2
- crescendo-decrescendo pattern
- Eg :- Aortic Stenosis, pulmonary stenosis

(ii) Pan systolic murmur :-
- uniform in intensity
- Start with S_1 and extend to S_2.
- Eg :- mitral regurgitation, Tricuspid regurgitation, ~~Tricop~~ and VSD.

(iii) Late systolic murmur :-
- occurs later in systole
- Eg :- mitral valve prolapse.

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→ Diastolic murmurs :- occur between S_2 and the next S_1

(i) Early diastolic murmurs

- Start immediately after S_2
- Eg:- Aortic Regurgitation, Pulmonary regurgitation

(ii) Mid- diastolic Murmurs

- Due to turbulent Blood flow across AV values during filling
- Eg:- mitral Stenosis, tricuspid Stenosis.

(iii) presystolic murmurs

- Heard just before S_1 due to atrial contraction.
- Eg:- Severe mitral or tricuspid Stenosis.

→ continuous murmurs:- persistent throughout systole and diastole, Eg:- Patent Ductus Arteriosus (PDA)

2. PITCH

* Determined by the frequency of the murmur

(i) High pitched murmurs

- Indicate high-velocity Blood flow
- commonly seen in conditions like Aortic Regurgitation

(ii) Low pitched murmurs

- Indicate low velocity of Blood flow
- Eg:- mitral Stenosis

* use the diaphragm of the Stethoscope for high pitched murmurs and use bell of the Stethoscope for low pitched murmurs.

3. QUALITY

* Describes the character of the murmur

(i) Blowing

- Seen in Regurgitant lesions
- eg:- mitral regurgitation, Aortic Rugeregitation.

(ii) Harsh

- Seen in Stenotic Lesions
- Eg:- Aortic Stenosis

(iii) Rumbling

- Seen in diastolic murmurs like mitral Stenosis.
- Eg:- mitral Stenosis

(iv) musical

- Rarely murmurs have a musical quality
- Eg:- Shills murmur in children

4. LOCATION

* Identified by where the murmur is loudest on auscultation.

(i) Aortic Area:- Right 2nd ICS (eg:- Aortic Stenosis)

(ii) pulmonary Area:- Left 2nd ICS (eg:- pulmonary Stenosis)

(iii) Tricuspid Area:- Lower Left Sternal Border (eg:- Tricuspid Regurgitation)

(iv) mitral Area:- Left 5th ICS in MCL (eg:- mitral Stenosis or regurgitation)

5. RADIATION (CONDUCTION)

* Describes the propagation of the murmurs sound

(i) Aortic Stenosis:- Radiates to the carotids.

(ii) mitral Regurgitation :- Radiates to the axilla
(iii) pulmonary Stenosis :- Radiates to the back
(iv) Tricuspid Regurgitation :- Radiates to the epigastrium.

6. VARIATIONS

* murmurs can vary with
  (i) Respiration :- Right sided murmurs (eg:- tricuspid Regu--rgitation) increase during inspiration due to increased venous return. Left-sided murmurs (eg:- mitral Stenosis) may increase during expiration.

  (ii) posture :- Standing decreases venous return and murmur intensity; squating increases it

  (iii) maneuvers:-
  → Valsalva maneuvers:- Reduces preload and diminishes most murmurs except hypertrophic cardiomyopathy (HCM) and mitral valve prolapse.
  → Hand grip:- Increases afterload, accentuating murmurs of mitral Regurgitation and VSD but Reducing aortic Stenosis murmur.

7. SIGNIFICANCE OF MURMURS

* Innocent / Functional murmurs :- common in children; no pathological significance
* pathological murmurs :- suggests underlying structural heart disease
* Eg:→ Systolic murmur in Aortic Stenosis indicates left ventricular outflow obstruction
  → Diastolic murmur in mitral Stenosis indicates impaired ventricular filling.

8. SYSTEMATIC APPROACH TO MURMUR EXAMINATION

(i) Inspect the precordium for abnormal pulsations or thrills.

(ii) palpate for thrills and the apex beat's location

(iii) Auscultate systematically over all cardiac areas with the diaphragm and bell, in both supine and lateral decubitus position

(iv) Identify, timing, pitch, quality, location, radiations and variation of the murmur

(v) correlate with clinical signs (eg:- cyanosis, heart failure symptoms).

CLINICAL CORRELATIONS OF DIFFERENT MURMURS

(Timing, pitch/ quality, Location, Radiation, Variation, Associated Findings

I. AORTIC STENOSIS

* Systolic Ejection murmur, Harsh and crescendo-decrescendo
* Loudest at the Right upper sternal Border
* To the carotids
* Increased with Squatting, decreased with Valsalva manu-euver.
* pulsus parvus et tardus, left ventricular hypertrophy

II. MITRAL STENOSIS

* mid-diastolic murmur
* Low-pitched, rumbling with an opening Snap.
* Loudest at the apex
* None
* Increased in the left lateral decubitus position after exercise

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* Left Atrial Enlargement, pulmonary Hypertension.

III. AORTIC REGURGITATION

* Early diastolic murmur
* High-pitched, Blowing, decrescendo
* Loudest at the Left Sternal border
* None
* Increased with handgrip or Squatting
* wide pulse pressure, bounding pulses, head bobbing.

IV. MITRAL REGURGITATION

* Holosystolic murmur
* High pitched, blowing
* Loudest at the apex
* To the axilla
* Increased with Handgrip and Squatting
* S_3 Sound, Left atrial enlargment.

V. TRICUSPID REGURGITATION

* Holopsystolic murmur
* High pitched, Blowing
* Loudest at the Left Lower Sternal Border
* To the liver area
* Increased with inspiration (Rasvalle's sign)
* Jugular venous distension, hepatic congestion.

VI. PULMONARY STENOSIS

* Systolic Ejection murmur
* Harsh and crescendo-decrescendo

* Loudest at the Left upper Sternal Border
* To the Back
* Increased with Inspiration
* Right ventricular heave, wide splitting of S2

VII. VENTRICULAR SEPTAL DEFECT (VSD)

* Holosystolic murmurs
* Harsh murmur
* Loudest at the Left Lower Sternal Border
* None
* None
* Thrill palpable in small defects., may cause pulmonary hypertension in large defects.

VIII HYPERTROPHIC CARDIOMYOPATHY (HCM)

* Systolic Ejection murmur
* Harsh crescendo-decrescendo
* Loudest at the Left Lower Sternal Border
* None
* Increased with Valsalva maneuver, decreased with Squatting
* S_4 sound Bifid Carotid pulse.

IX PATENT DUCTUS ARTERIOSUS (PDA)

* continuous machinery murmur
* continuous, high pitched
* Loudest at the Left infraclavicular area
* None
* None
* Bounding pulses, wide pulse pressure.

X MITRAL VALVE PROLAPSE (MVP)

* Mid systolic click followed by late systolic murmur
* High-pitched, crescendo
* Loudest at the apex
* To the axilla
* Increased with standing or Valsalva maneuvres, decreased with squatting
* Associated with connective tissue disorders like marfan's syndrome

XI STILL'S MURMUR (INNOCENT MURMUR)

* Early to mid systolic
* Low-pitched, musical or vibratory
* Loudest at the Left Lower sternal border
* None
* Louder when lying down, softer with standing
* common in healthy children

XII COARCATION OF THE AORTA

* Systolic murmur
* Harsh [illegible] murmur
* Loudest at the Left infraclavicular region or back
* None
* None
* Radial-Femoral delay, rib notching on chest XRay

XIII TETRALOGY OF FALLOT

* Systolic Ejection murmur
* Harsh and crescendo-decrescendo
* Loudest at the Left upper sternal border
* None

* None
* Cyanosis, clubbing and boot shaped heart on X Ray

XIV ATRIAL SEPTAL DEFECT (ASD)

* Systolic Ejection murmur
* Soft, crescendo-decrescendo
* Loudest at the Left upper Sternal Border
* None
* None
* Wide, fixed splitting of S_2, right ventricular heave

XV PERICARDIAL FRICTION RUB

* Continuous murmur
* Scratchy, high pitched
* Best heard over left lower Sternal Border
* None
* Louder when leaning forward
* Sharp pleuritic chest pain relieved by sitting up.

XVI EBSTEIN'S ANOMALY

* Holosystolic murmur
* High pitched, blowing
* Loudest at the Left Lower Sternal border
* To the liver area
* Increased with inspiration
* Associated with cyanosis and atrial septal defect

XVII RHEUMATIC HEART DISEASE

* Various murmurs

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* dependent on valve involvement
* variable locations
* None
* Dependent on the valve disease.
* mitral Stenosis or regurgitation, aortic Regurgitation.

XVIII AUSTIN FLINT MURMUR.

* mid to late diastolic murmur
* Low pitched, rumbling
* Loudest at the apex
* None
* Increased with Squatting
* Severe aortic regurgitation