

The background of the slide is a dark, semi-transparent image of a medical chart with a stethoscope resting on it. A large, bright blue geometric shape, resembling a stylized 'L' or a corner, is overlaid on the left side of the image.

HISTORY TAKING AND PHYSICAL EXAMINATION IN CVS PEDIATRICS

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Bluepen online

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1. Symptoms – s/o heart disease?

- Feeding difficulties
- Poor weight gain
- Irritability
- Excessive crying
- Bluish extremities
- Excessive perspiration
- Wheezing
- Noisy laboured breathing
- Frequent RTI
- Oliguria
- Breathlessness
- Fatigue and weakness
- Cough
- Chest pain
- Swelling of feet
- Joint pain
- Painful swelling in finger pulps
- Syncope
- Involuntary movements
- Haemontysis

2. Is it Congenital or Acquired ?

Congenital

- Symptoms from infancy
- Feeding difficulties → FTT
- Recurrent hospital admissions

Acquired

- Rheumatic fever:
 - joint pain, chorea
- Fever,

| | <i>Central</i> | <i>Peripheral</i> |
|---------------------------|---|--|
| Mechanism | Diminished arterial oxygen saturation | Diminished flow of blood to the local part |
| Sites | On skin and mucous membranes e.g. tongue, lips, cheeks etc. | On skin only |
| Clubbing and polycythemia | Usually associated | Not associated |
| Temperature of the limb | Warm | Cold |
| Local heat | Cyanosis remains | Cyanosis abolished |
| Breathing pure oxygen | Cyanosis decreased | Cyanosis persists |

NADA's Criteria

□ Major :

- Systolic murmur Gr. III or more in intensity.
- Diastolic murmur
- Cyanosis
- CHF

□ Minor:

- Systolic murmur Gr. II or less in intensity.
nd sound □
- Abnormal 2
- Abnormal ECG
- Abnormal CXR
- Abnormal BP

Presence of 1 major or 2 minor criteria suggest presence of Heart Disease

Perinatal History

- Was the mother immunized against rubella prior to delivery?
- Was the mother scanned in antenatal period?
- H/o fever with rash in ^{1st} trimester, painful swelling behind the ear.

Maternal conditions

| Maternal Conditions | Heart Defects to be expected |
|------------------------|------------------------------|
| Diabetes | TGA, VSD, PDA, HOCCM |
| SLE | Congenital heart block |
| Phenylketonuria | TOF, VSD, ASD, PDA, CoA |

Intake of teratogenic drugs

| Drugs | Cardiac Defect |
|-------------------------|-------------------------------|
| Sodium Valproate | CoA, HLHS, AS, VSD |
| Hydantoin | PS, ASD, VSD, PDA |
| Alcohol | VSD, PDA, ASD, TOF |
| Thalidomide | TOF, ASD, VSD, TA |
| Lithium | EBSTEIN'S ANAMOLY |
| Amphetamines | ASD, VSD, PDA, TGA |
| Indomethacin | Intrauterine closure of PDA |
| Vit A | TOF, TGA, TA |
| Vit D | Supravalvular aortic stenosis |

Postnatal history

- Neonatal cyanosis
- Breathing difficulties
- Feeding problems
- Delay in growth

Family History

- Consanguinity
- Maternal age at conception
- Age of the father
- Heart disease in family
- Hereditary diseases
- - PS common in Noonan syndrome
- Rheumatic fever
- Diabetic mother



Interaction Time

General Examination

- Dysmorphic features/syndromes :

| Disorder/Syndrome | Common Cardiac Defect |
|-------------------|------------------------|
| Down's | ECD, VSD |
| Edward | VSD, PDA, PS |
| Patau | VSD, PDA, Dextrocardia |
| Noonan | PS |
| Marfan | AR, MVP |
| Turner | CoA, AS, ASD |
| Holt-Oram | ASD (Ostium Primum) |

- Clubbing
 - Infective endocarditis, Cyanotic heart disease
- Odema : pedal/sacral
 - Restrictive or severe tricuspid valve diseases
- Sweating on forehead
- Chest and spine deformities
 - Shifting of apical impulse in scoliosis/kyphosis
- Skin
 - Rheumatic nodules
- Pallor



□ Anthropometry :

□ Weight


- –CHF, cyanotic heart disease
- FTT ■ Weight might increase due to odema

□ Height

- short stature
- Tall/

CVS Examination

- Pulse
- BP
- JVP
- Inspection of precordium
 - Bony/Spine deformities
 - Chest shape
 - Trachea central/deviated
 - Visible precordial bulge
 - Visible pulsations
 - Scars, dilated veins, sinuses.

- 
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- Palpation
 - Apex beat
 - Parasternal Heave
 - Thrills
 - Any palpable pulsations in precordial region
 - Percussion
 - Auscultation

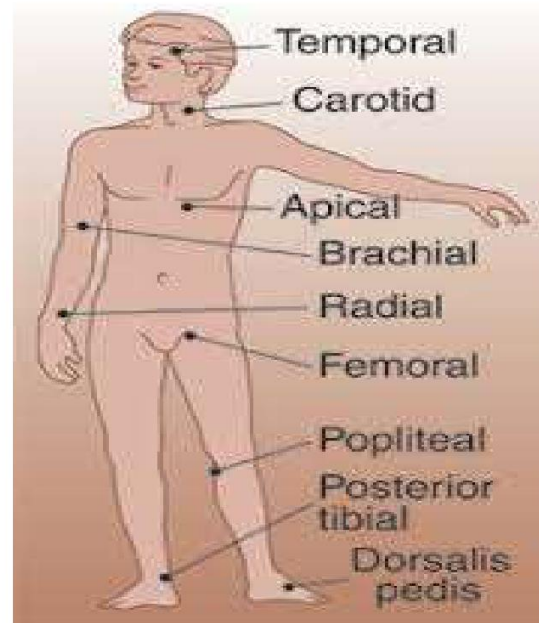
Pulse

- A pulse is a waveform that is felt by the finger, produced during cardiac systole which travels along the arterial tree, at a rate much faster than that of blood column.

| <i>Artery</i> | <i>Time at which pulse wave arrives after cardiac systole</i> |
|---------------|---|
| Carotid | 30 milliseconds |
| Brachial | 60 milliseconds |
| Femoral | 75 milliseconds |
| Radial | 80 milliseconds |

Assessment of pulse

- Rate
- Rhythm
- Volume
- Character
- Pulse deficit
- Condition of vessel wall
- R-F delay
- Symmetry
-



□ Pulse rate :


- Counted for full 1 minute by palpating the radial artery

Normal Heart Rate

| Age | Heart Rate (Beats/min) |
|--------------|------------------------|
| Infants | 120-160 |
| Toddlers | 90-140 |
| Preschoolers | 80-110 |
| School agers | 75-100 |
| Adolescent | 60-90 |
| Adult | 60-100 |



Interaction Time

- 
-
- Tachycardia:
 - Rheumatic fever
 - Congestive cardiac failure
 - Arrhythmias

 - Bradycardia :
 - Complete heart block
 - Sick sinus syndrome (sino-atrial disease)



□ **Pulse rhythm:**

□ Normal sinus rhythm : Regular

□ Regularly irregular rhythm :

■ arrhythmias
Sinus

□ Irregularly irregular rhythm

■ Fibrillation

■ Atrial
Atrial Flutter with varying degree of heart block



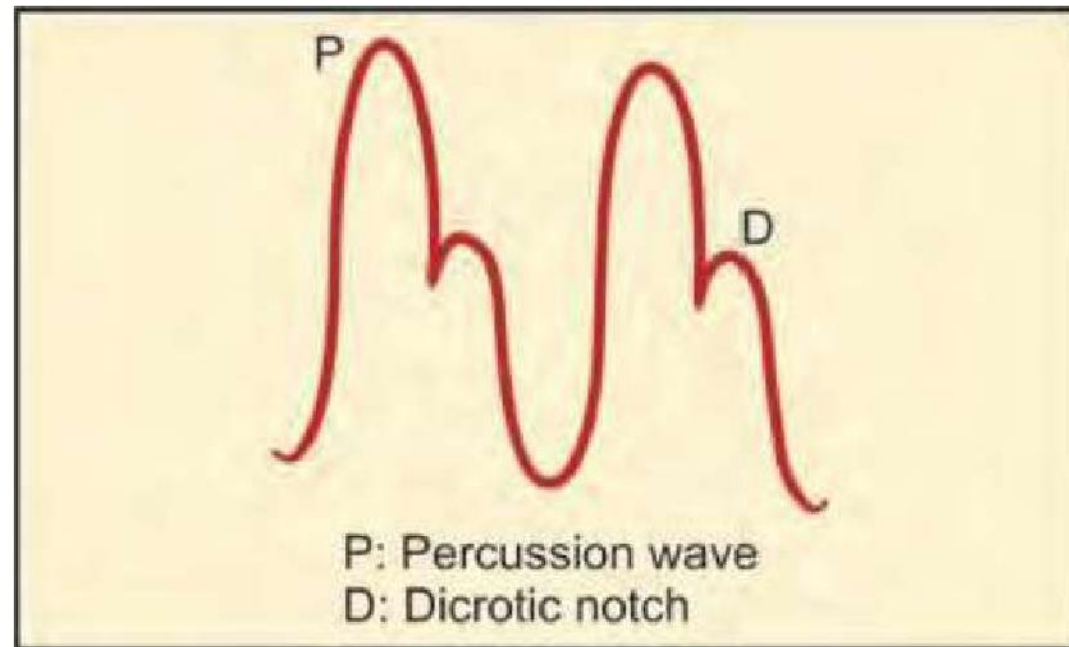
□ **Pulse Volume :-**

- Assessed by palpating Carotid artery.
- PP gives accurate measurement of pulse vol.

| Large Volume Pulse (Bounding) | Small Volume Pulse (Weak, Thready) |
|----------------------------------|---|
| Aortic Incompetence (AR) | CCF |
| PDA | Pericardial effusion |
| A-V Fistula | Constrictive pericarditis |
| Persistent truncus arteriosus | Lower limb in CoA |

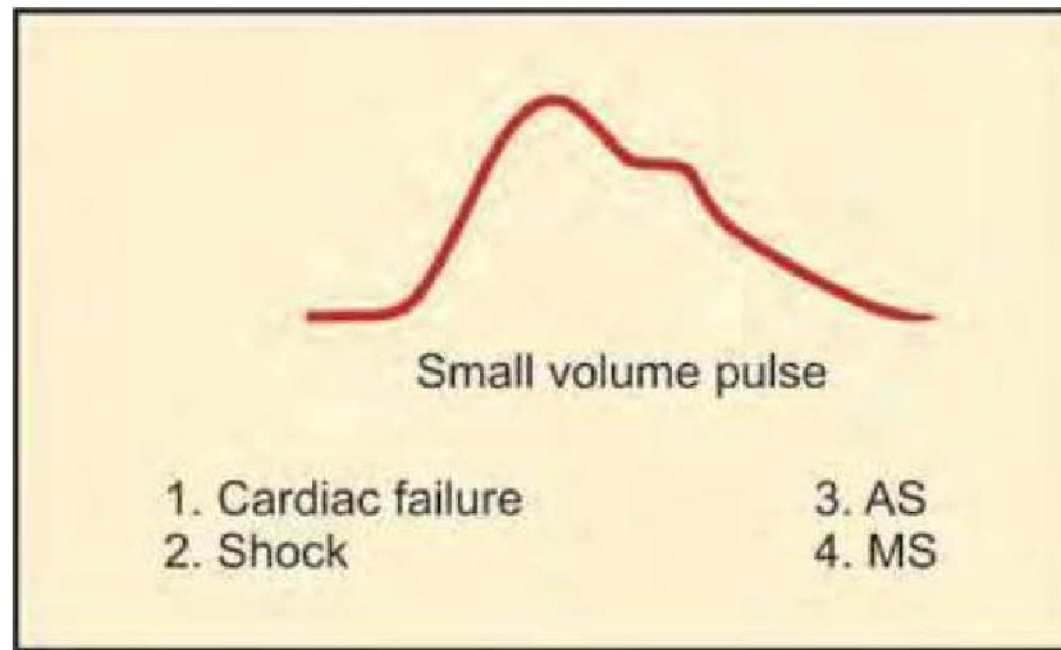
- **Pulse character**

- Best assessed in carotid artery

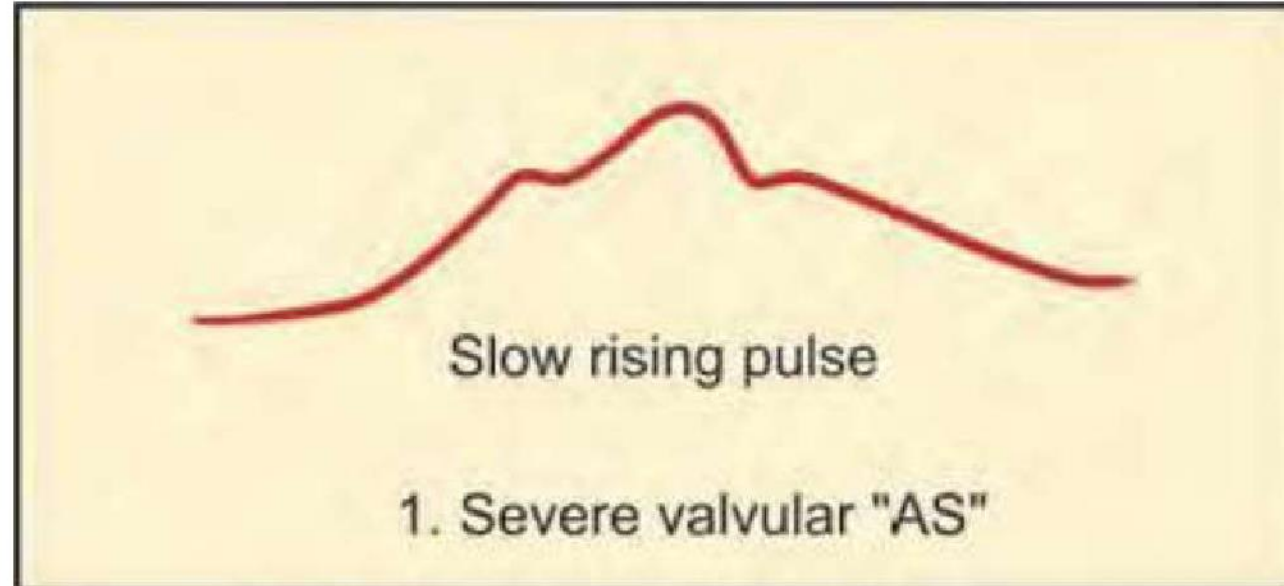


□ Hypokinetic Pulse:

- Small weak pulse (Small vol. And narrow PP)

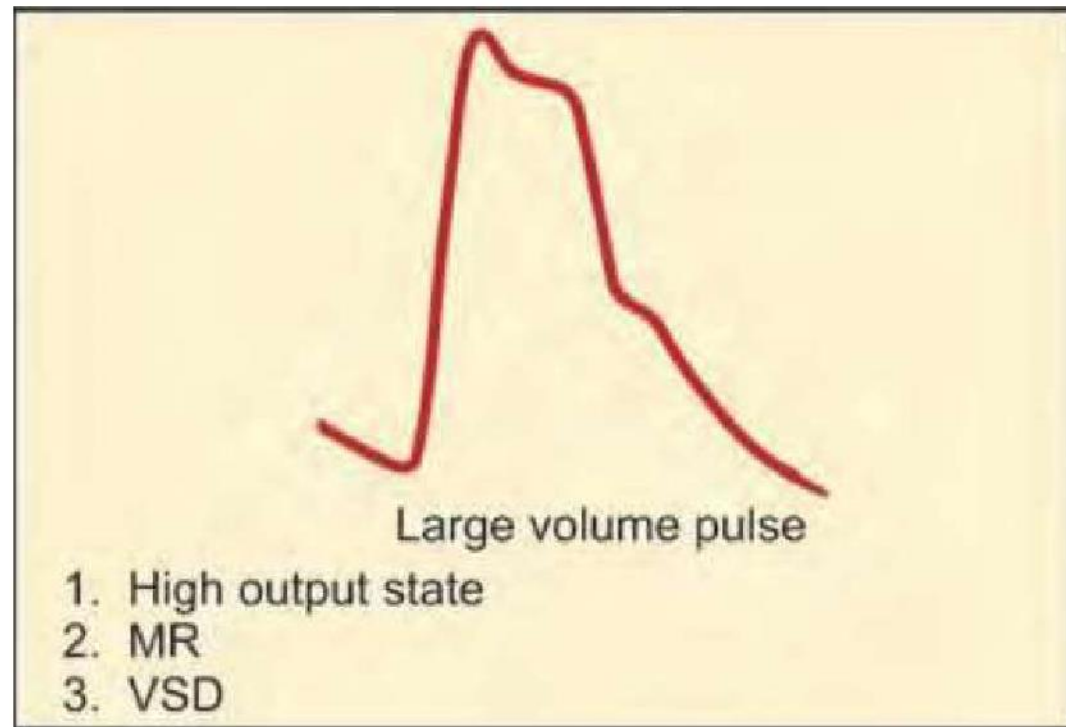


- Anacrotic Pulse (Parvus et Tardus):
 - Parvus: low amplitude
 - Tardus : slow rising and late peak



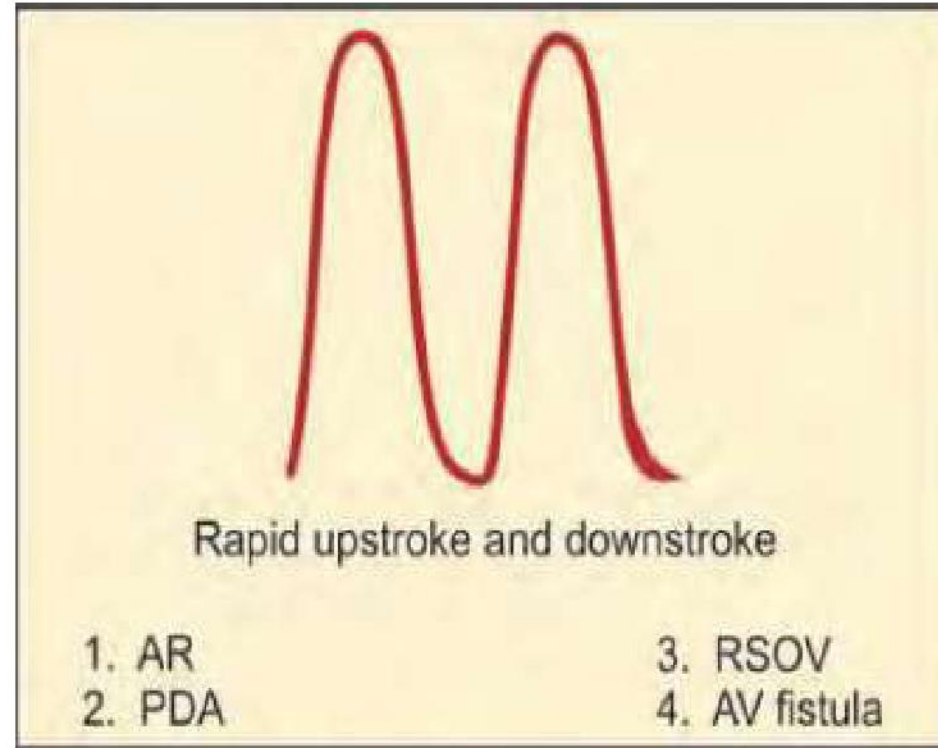
- Hyperkinetic Pulse

- Rapid rise
- High amplitude
- Large vol. & wide PP



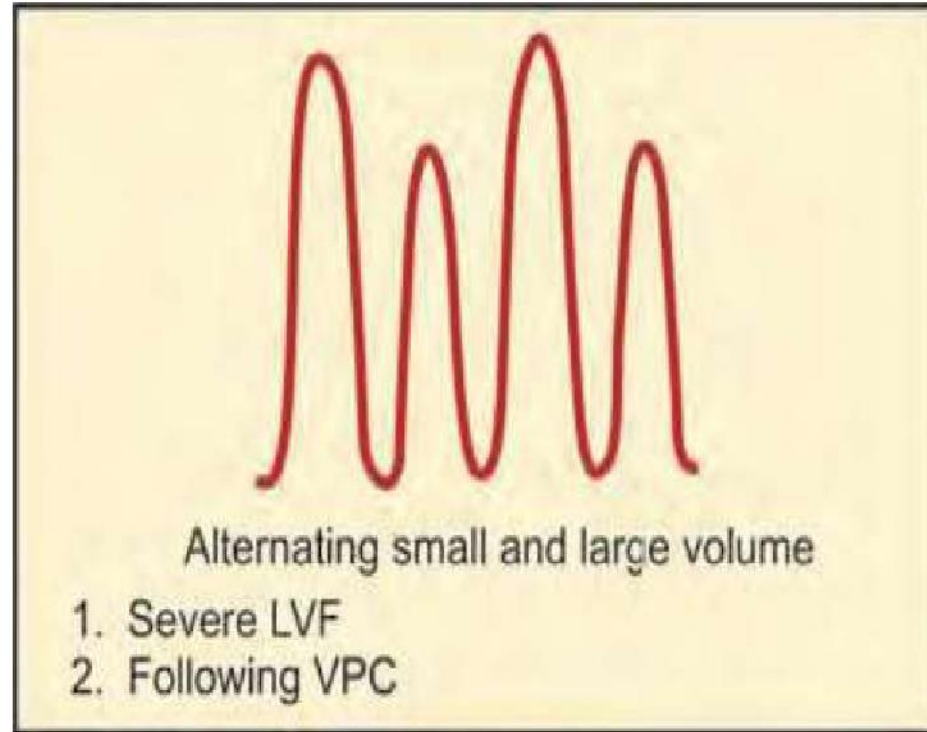
□ Collapsing pulse :

- Rapid upstroke
- Rapid downstroke
- Large Stroke volume

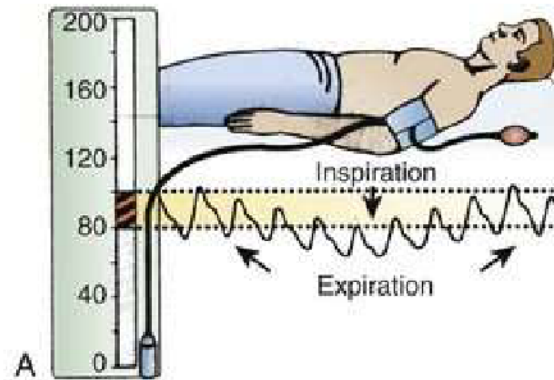


□ Pulsus alterans

- Alternating small & large vol. pulse with irregular rhythm
- Best appreciated by palpating radial and femoral pulses



□ Pulsus Paradoxus :



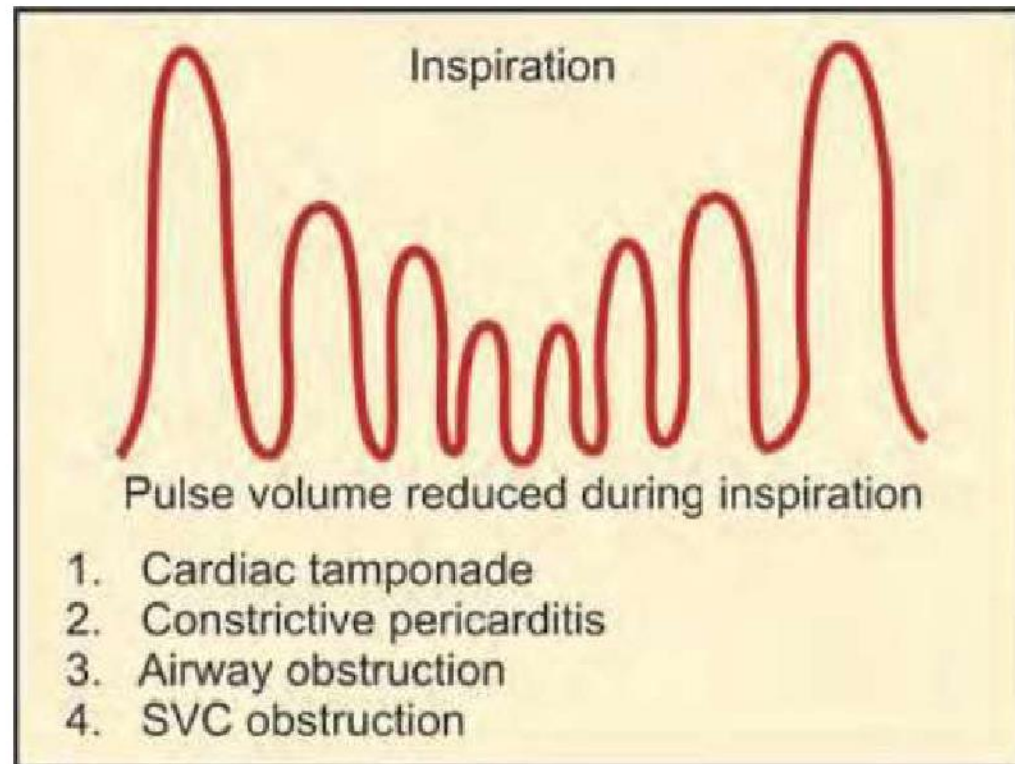
PROCEDURE FOR THE MEASUREMENT OF PULSUS PARADOXUS

The patient should be reclining at a 30° to 45° angle and instructed to breathe normally.

1. Inflate a standard blood pressure cuff until Korotkoff sounds over the brachial artery disappear.
2. Lower pressure in the cuff a few millimeters of mercury per second until the first Korotkoff sounds appear during expiration.
3. Maintain pressure at this level and observe the disappearance of sounds during inspiration. Record this cuff pressure.
4. Very slowly lower cuff pressure until Korotkoff sounds are heard throughout the respiratory cycle. Record this cuff pressure.
5. The difference between pressures recorded in the two previous steps is then recorded as the measurement (in millimeters of mercury [mm Hg]) of pulsus paradoxus. A pulsus paradoxus >12 mm Hg is abnormal but nonspecific (see text).

B

- When the fall in BP is more than 10 mmHg during inspiration, it is Pulsus paradoxus.





□ **Pulse Deficit:**

- Difference between HR & PR when counted simultaneously for 1 min.
- Causes : Atrial fibrillation and VPCs

□ **Radio-radial delay:**

- Seen in : Pre Subclavian coarctation, supraaortic AS

□ **Radio-femoral delay:**

- Seen in : CoA, Aortic embolism

Blood Pressure



JVP

- Expressed as vertical height from the sternal angle to the zone of transition of distended and collapsed JVP.
- The patient is kept at 45 degree.
- The upper level of pulsations in the IJV is seen.

- JVP – indicator of Rt. Atrial pressure
- Centre of RA is approx 5 cm from sternal angle.
- Right Atrial Pressure = Vertical ht. Of blood column+ 5 cms (cm of H₂O)
 - Normal JVP = < 8 cms of H₂O or < 6mmHg



□ **Elevated JVP:**

- CCF
- TS,TR
- Constrictive pericarditis
- Cardiac tamponade

□ **Fall in JVP:**

- Hypovolaemia
- Shock

□ **Kussmaul's sign –**

- Constrictive pericarditis
- Cardiac tamponade
- RV failure

□ **Hepato-Jugular reflex:**


- Right heart failure
- TR

□ **Friedrich's sign:**

- Rapid fall and rise of JVP
- TR
- Constrictive pericarditis



Interaction Time

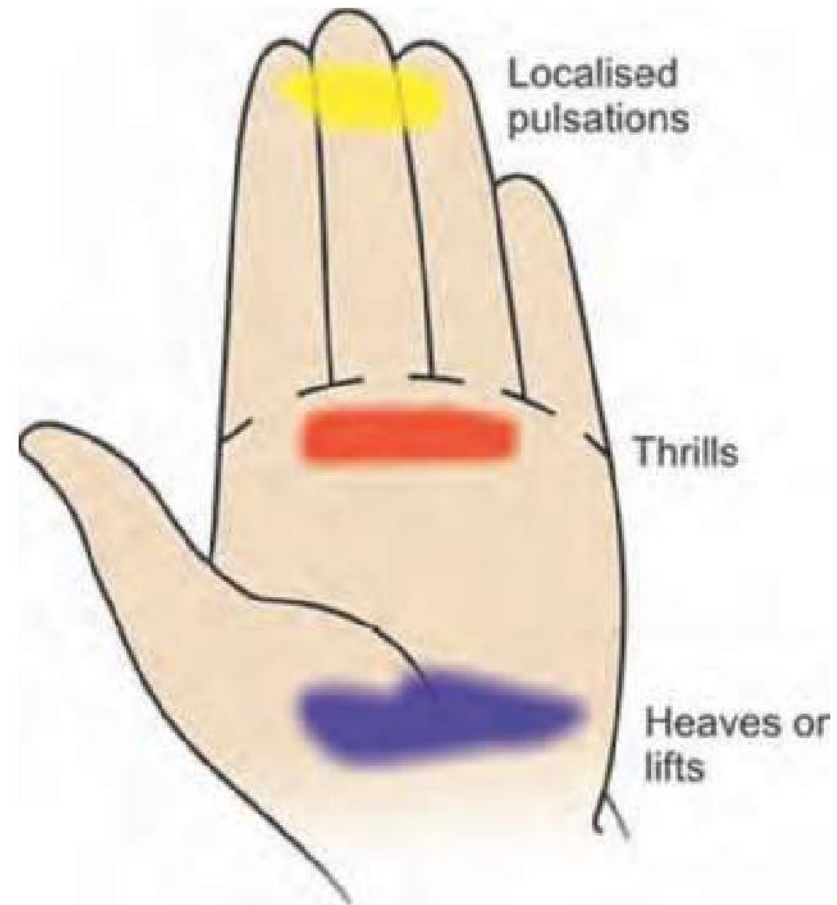
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- Precordial bulge :
 - Long standing cardiac disease

Visible pulsations

- **Carotid Pulsations:**
 - Hyperdynamic states
 - AR
 - CoA
- **Suprasternal pulsations:**
 - AR
 - CoA
 - Thyrotoxicosis
- **Epigastric pulsations:**
 - Pulsations of liver in CHF with TR
 - RVH
 - Abdominal aorta aneurysm
 - Tricuspid stenosis
- **Back:**
 - CoA

Palpations

- General rule :
 - Fingertips to feel pulsations,
 - Base of fingers : Thrills,
 - Base of hand (or ulnar aspect) : Heaves



□ Apical Impulse :

- It refers to the lowermost and outermost point of definite cardiac impulse, which gives maximum thrust to the palpating finger.

Normal variation in location of apical impulse with age

| Age | Position of apical impulse | Relation to midclavicular line |
|----------------|----------------------------|--------------------------------|
| Infancy | Left 4 th ICS | Lateral to mid clavicular line |
| Approx 5 years | Left 5 th ICS | In the Midclavicular line |
| Older children | Left 5 th ICS | Medial to midclavicular line |



Fig. 3.19: Palpating the apical impulse with hand



Fig. 3.20: Locating the apical impulse with the finger



- Parasternal Heave :

- A palpable thrust, which lifts the palpating hand.
- Seen in RVH and Left atrial enlargement.
- Palpated by ulnar aspect of hand.
- Grading :
 - I. Instant lift, visible not palpable
 - II. Visible and palpable, lift can be obliterated
 - III. Visible and palpable, lift cant be obliterated



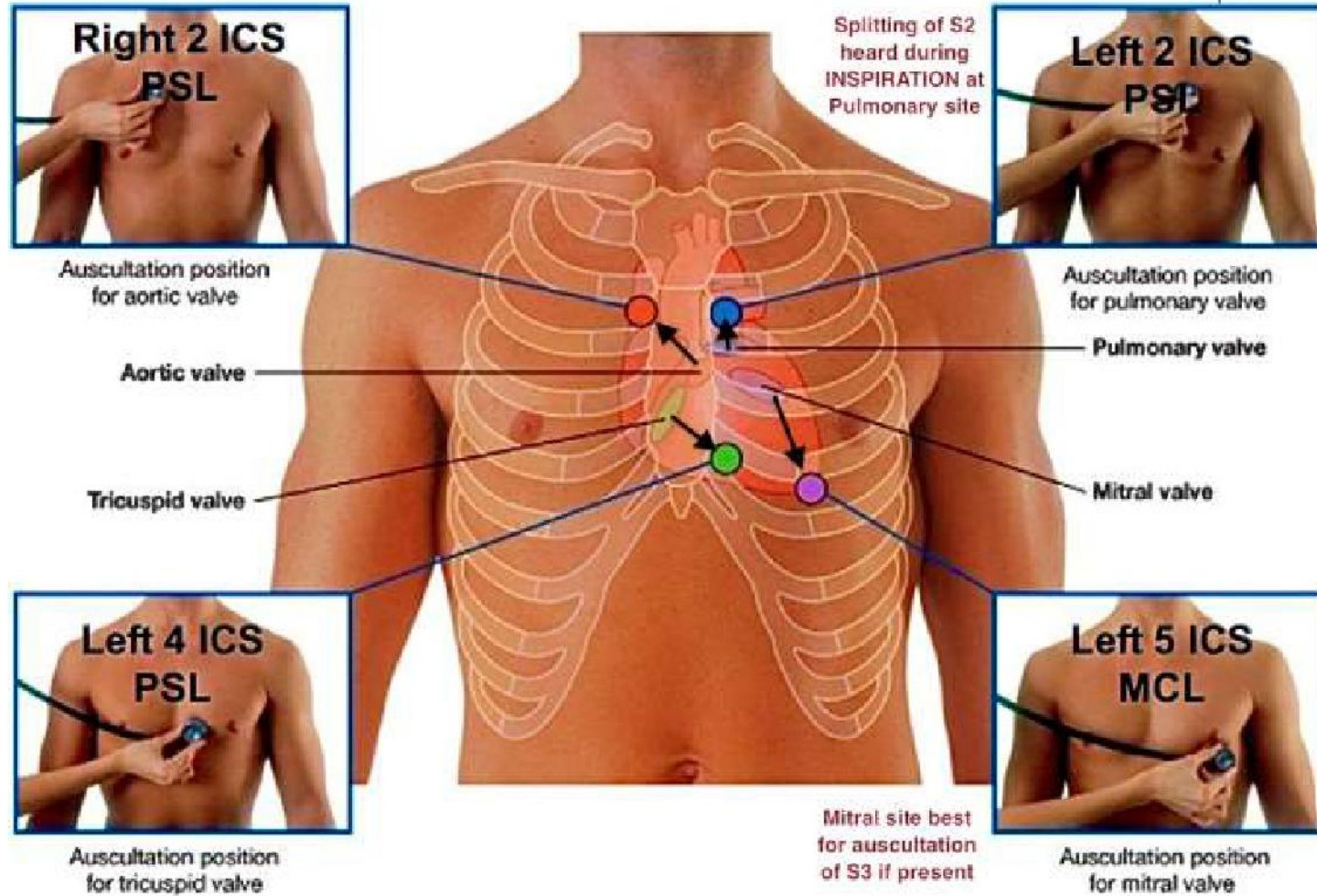
- Thrills :

- These are palpable vibrations of murmurs which accompany any organic murmur of grade 3 or more.

Percussion

- It is done basically to see enlargement of dullness of the cardiac region.
 - Cardiac causes : Cardiomegaly, pericardial effusion

Auscultation



□ Heart sounds:

| Normal Sounds: | <i>Heart Sounds</i> | |
|-------------------------------|--------------------------------|-------------------------------------|
| <i>Qualities</i> | S1 - (A) | S2 - (B) |
| Event | Atrioventricular valves close. | Semilunar valves close. |
| Pitch | Lower | Higher |
| Duration | Longer | Shorter |
| Point of Maximal Intensity | Apex Beat / Mitral area | Base of the Heart |
| Location in the Cardiac Cycle | At the end of the long pause. | At the beginning of the long pause. |

S1 Abnormalities

| Soft S1 | Loud S1 | Split | Reverse split |
|----------------------------|--------------------|--------------------|---------------|
| MR | MS | RBBB | RVP |
| TR | TS | LVP | Ectopic beats |
| Calcification of AV valves | High output states | Pulm. Hypertension | |

S2 Abnormalities

| Soft S2 | Loud S2 | | Single S2 | |
|---|-----------------------------|-----------|-----------|-----------|
| | Loud A2 | Loud P2 | Absent A2 | Absent P2 |
| AS | Syst. Htn | Pulm. Htn | AS | PS |
| PS | Aortic ASD, PDA aneurysm | | | TOF |
| Calcified lesions of semilunar valves aorta | Dilated | Large VSD | | TGA |

Splitting of S2

| Wide- Fixed | Wide- Variable | Narrow | Reverse-split |
|------------------|----------------|-----------|------------------|
| Early A2/Late P2 | VSD | Severe AS | Late A2/Early P2 |
| MR | LVP | Severe PS | Aortic stenosis |
| ASD, | RBBB | | HOCM |

□ S3 and S4

Comparing the 3rd and 4th heart sounds

LearnTheHeart.com

| S3 - "ventricular gallop" | S4 - "atrial gallop" |
|----------------------------------|---------------------------------|
| Occurs in early diastole | Occurs in late diastole |
| Occurs during passive LV filling | Occurs during active LV filling |
| May be normal at times | Almost always abnormal |
| Requires a very compliant LV | Requires a non-compliant LV |
| Can be a sign of systolic CHF | Can be a sign of diastolic CHF |

Causes of S3

Physiological S3

Children

Young adults

Pathological S3

High output states

CHD – ASD, VSD, PDA

MR, TR, AR



- Opening Snap

- Due to opening of AV valves

- Can be heard at the apex :

- MR

- MS, VSD

- PDA

- Or can be heard at parasternal region :

- Tricuspid stenosis


- Tricuspid regurgitation

- ASD



□ **MURMURS :**

- Occur due to the turbulence caused by either an increased flow through a normal/stenosed valve or a normal flow through a stenosed valve/orifice
- Auscultation should be done over precordium, back and over carotids

- 
-
- They should be described in the following way
 - Pitch
 - Timing & character
 - Systolic/diastolic
 - Area where best heard
 - Intensity
 - Whether best heard with bell or diaphragm
 - Conduction
 - Variation with respiration
 - Posture in which best heard
 - Variation with dynamic auscultation.

□ Systolic murmur grading

- I. Very soft (heard in quite room)
- II. Soft, but easily audible
- III. Moderate, no thrill
- IV. Loud with thrill
- V. Very loud with thrill, heard with steth barely placed on chest
- VI. Loud and audible with stethoscope just off the chest wall

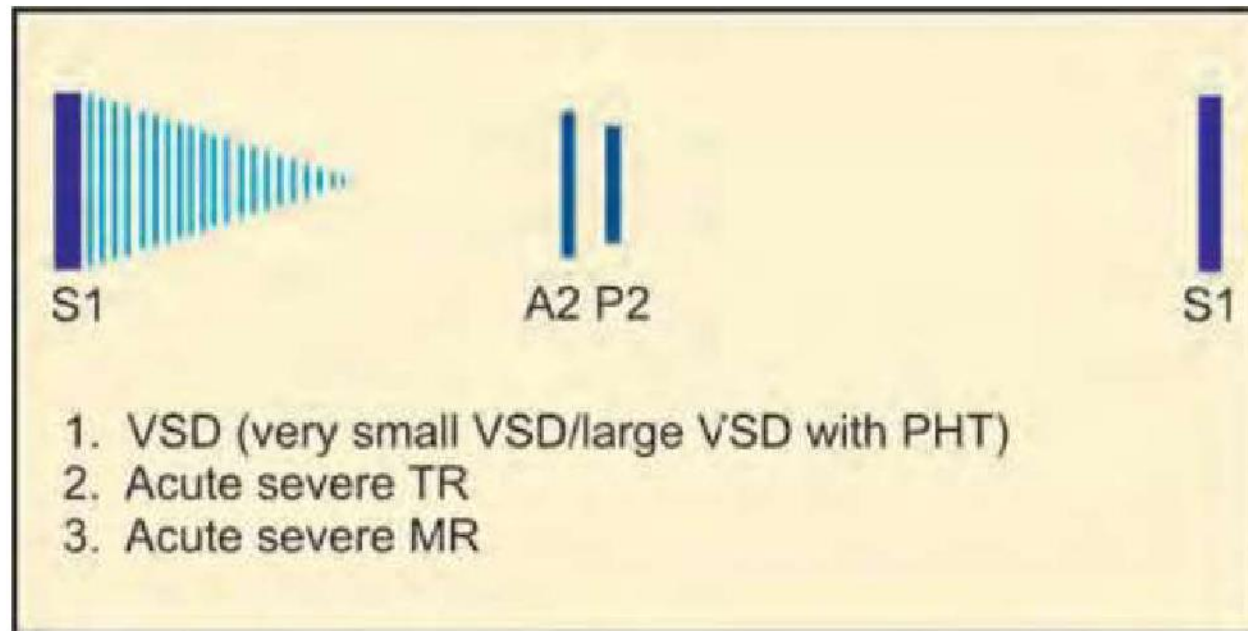
□ Diastolic murmur grading

- I. Very soft
- II. Soft
- III. Loud
- IV. Loud with thrill

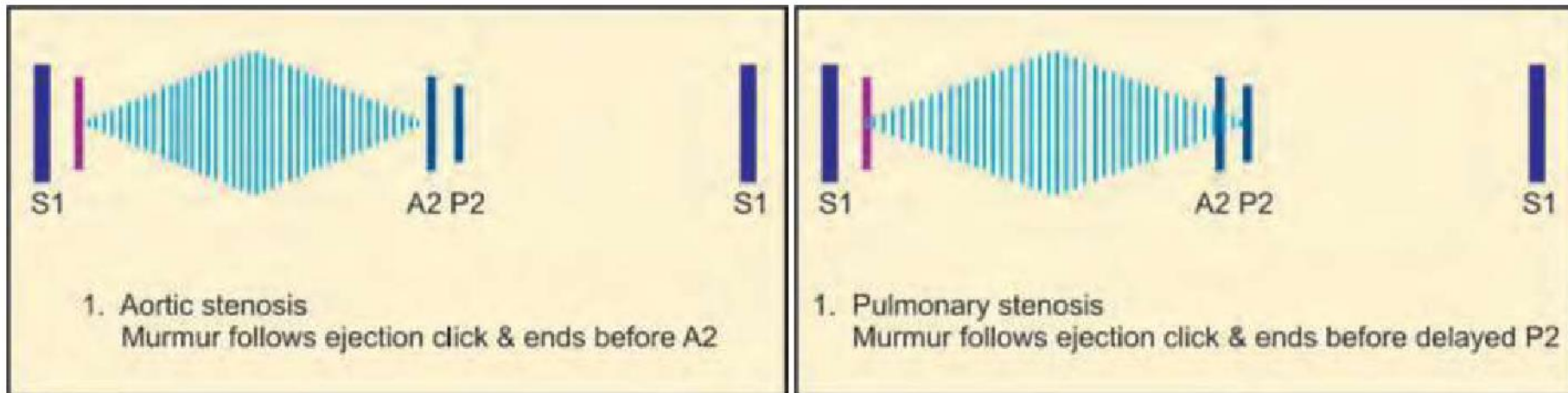


Interaction Time

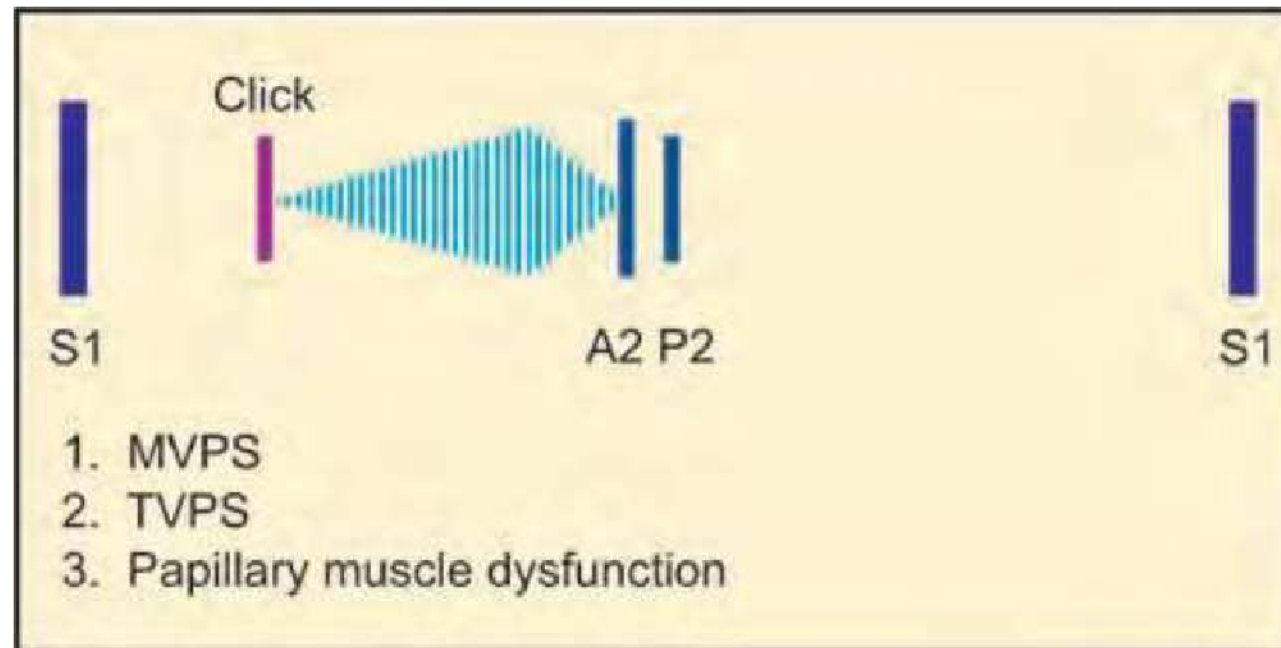
□ Early systolic murmur:



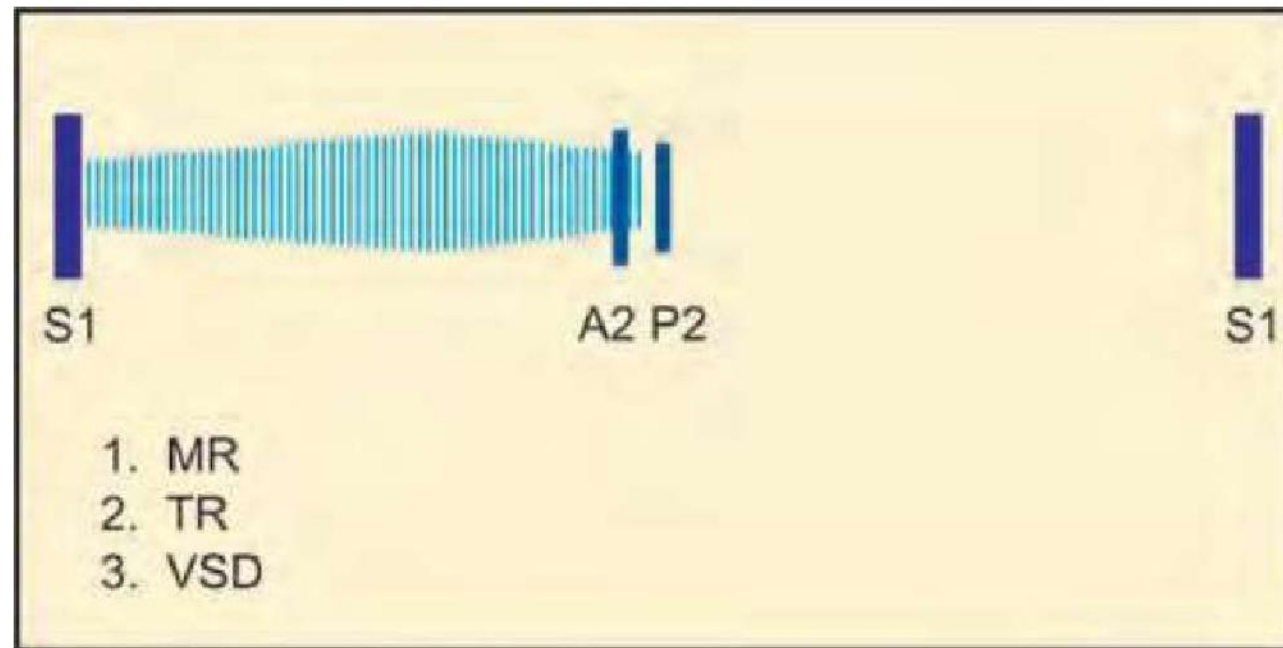
□ Ejection systolic murmur



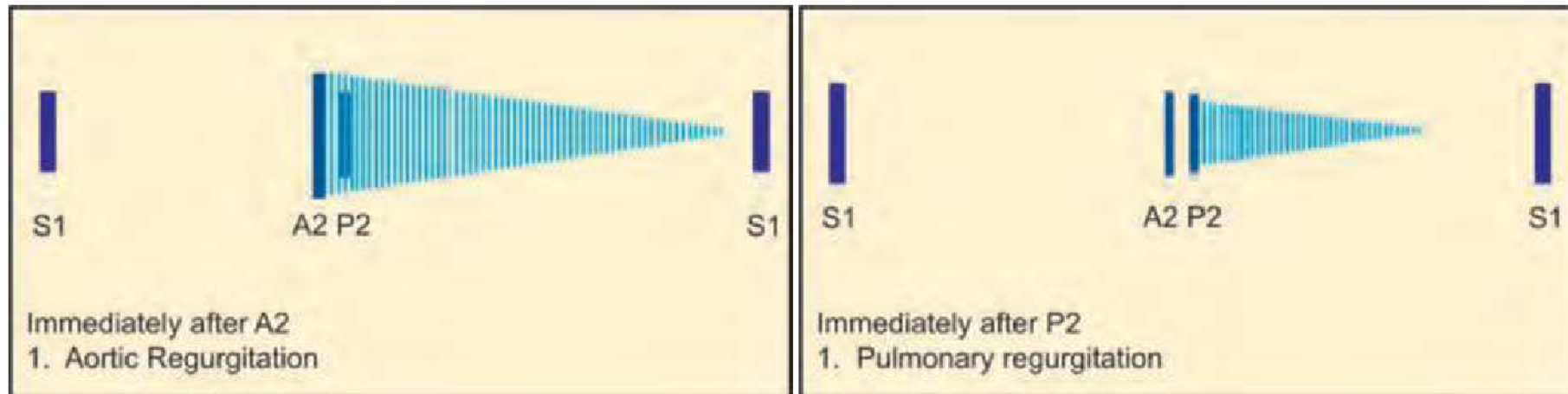
□ Late systolic murmur



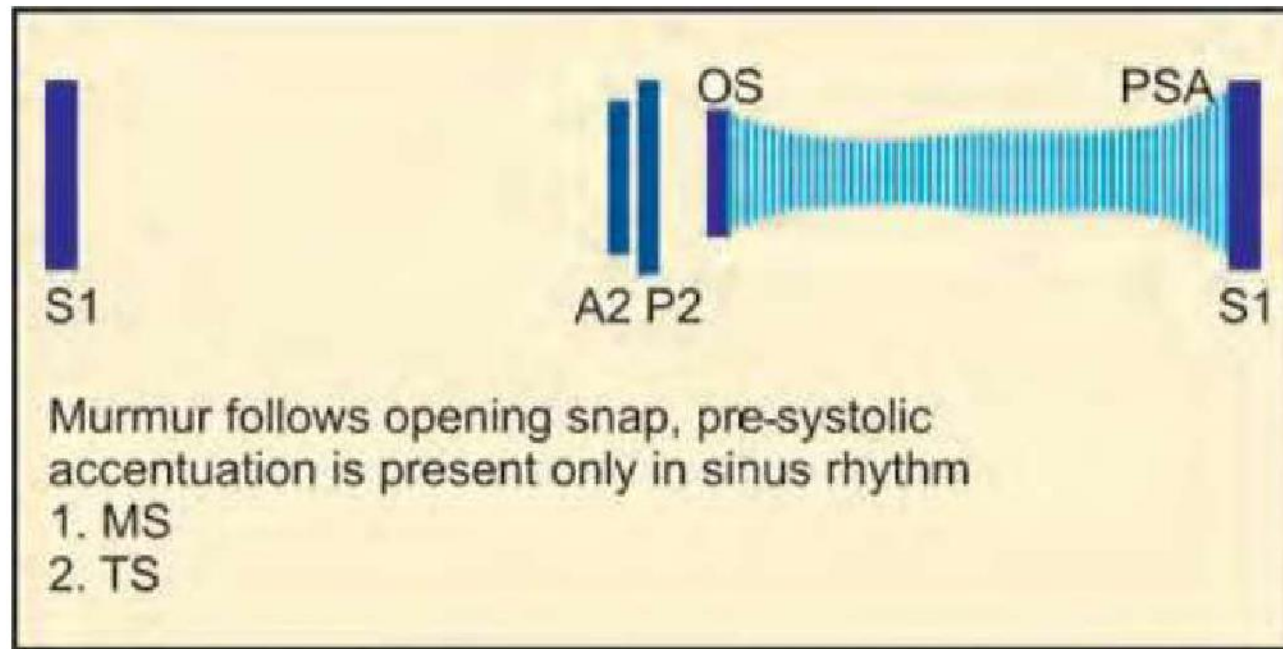
□ Pansystolic murmur




□ Early diastolic murmur

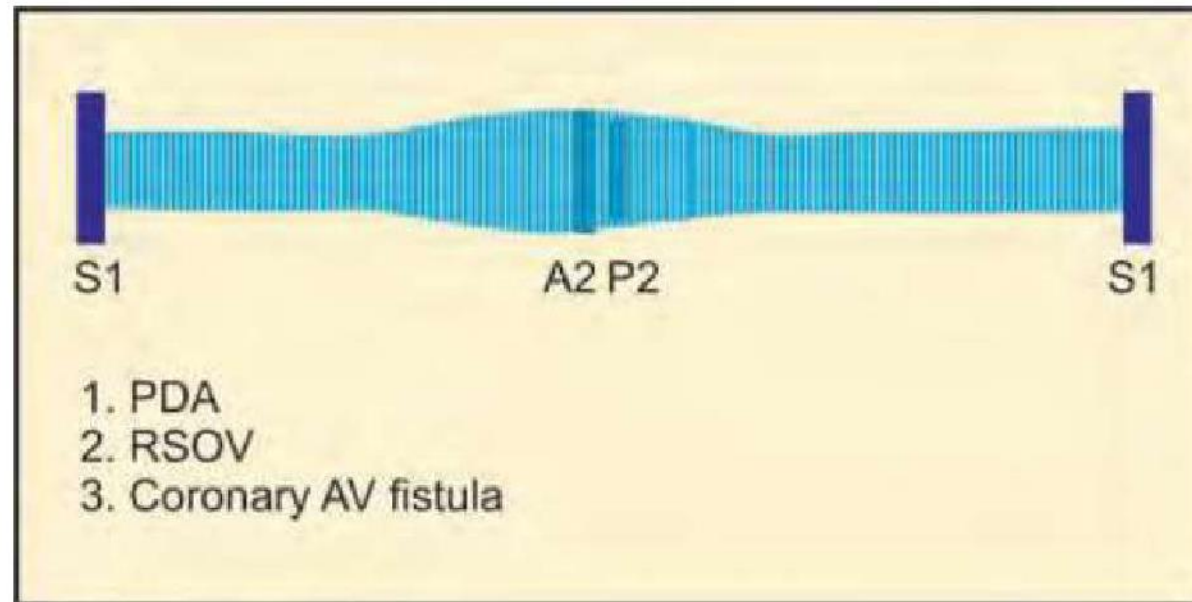


□ Mid diastolic murmur:



- 
-
- Late diastolic murmur:
 - MS
 - TS
 - Atrial myxomas

□ Continuous murmur:



□ Named Murmurs:

□ Carey-coomb's :

- Midsystolic
- Short
- Best heard at apex
- MS in acute RHD

□ Graham-steele :

- High pitched, early diastolic
- Best heard at left sternal border, 2 ICS
- During expiration in PR



- Gibson's

- Continuous machinery murmur of PDA

- Austin flint:

- pitched rumbling mid diastolic murmur
- Best heard at apex in severe AR



Interaction Time & Summary

Thank You

- Give us your feedback
- Please let's know what do you want
- We open discussion forum
- Knowledge is an ocean
- We focus on your continuous improvement.
- We assess right time with right faculty and create success
- 100% Students Engagement + Personalized Learning

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