

CVS Examination

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CVS Examination

• Common case in exam:-

- 1-Mitral regurgitation. (M.R)
- 2-aortic stenosis. (A.S)
- 3-prosthetic valve .
- 4- aortic regurgitation. (A.R)
- 5-tricuspid regurgitation. (T.R)
- 6-mitral stenosis. (M.S)

*Preparation for examination:-

- Stand on the Right side of bed.
- Introduce yourself.
- Permission taken.
- Good position for PT: - Put PT in 45°.
- Good exposure: - shoulders and neck above, epigastrium below.

1-inspection: = Stand at the end of the bed, and look for:-

- **Symmetry** ⇒ Chest Deformity: -
 - **Pigeon chest**/pectus carinatum ⇒ prominent of sternum.
 - **Funnel chest**/pectus excavatum ⇒ indentation of lower sternum.
 - **Barrel chest**:- A/P diameter equal with transvers diameter ⇒ (chronic asthma, emphysema) N.B:-this deformity can lead to RT ventricular hypertrophy.
- **Scar: - sternotomy** ⇒ valve replacement, CABG.
 - Infra-clavicular** ⇒ implantable pacemaker, subclavian line.
 - Lateral thoracotomy scar or infra-mammary** ⇒ valvoplasty, valvotomy, coarctation of aorta
- **Skin Discoloration**:- bruises most likely in PT on warfarin over dose in case of prosthetic valve or AF.
- **Superficial veins**:- in veins obstruction as (SVC,). E.g. pancast tumor of lung OR cervical rib syndrome
- **Superficial pulsation**:-
 - **Forceful apical pulsation** ⇒ Left ventricular hypertrophy.
 - **Diffuse apical pulsation** ⇒ cardiomyopathy or post MI.
 - **Left parasternal pulsation** ⇒ Right ventricular hypertrophy.
 - **Lt 2nd ICS pulsation** ⇒ enlarged pulmonary artery (pulmonary HTN) .
 - **RT 2nd ICS pulsation** ⇒ aortic aneurysm.

- **Epigastric pulsation** ⇒ 1- normal in thin person.
- 2- Rt ventricular enlargement. 3- Abdominal aneurysm,
- 4- Pancreatic cyst, 5- Pulsatile liver in TR

2- Palpation:-

A) Apical beat position:- most downward & most lateral palpable beat.

Apical beat usually palpate in left 5th intercostal space at mid-clavicular line but if displacement indicates of left ventricular dilatation as in (MR ,AR) but not AS b/c no dilatation in aortic stenosis only hypertrophy

N.B:- if Impalpable ask p.t to turn in left lateral position if still Impalpable think for: - D/D

{Obesity, under the rib, pericardial effusion, plural effusion , hyper inflated chest , Dextrocardia}.

B)-Apical beat character: - normally ⇒ gentle non-sustained

• **Forceful and Sustained impulse** ⇒ indicates a pressure overloaded in left ventricle e.g. (Hypertension or aortic stenosis)

• **Forceful but unsustained impulse** ⇒ indicate a volume overloaded in left ventricle e.g.(aortic regurgitation, mitral regurgitation)

• **Diffuse apex beat** ⇒ dilated cardiomyopathy .

• **Double apex beat** ⇒ HOCM

• **Tapping:** - palpable S1 ⇒ as M.S .

C) Heave in Lt Parasternal area ⇒ indicates Rt ventricular hypertrophy.

N.B:- Heave or lift ⇒ more vigorous apical impulse than expected.

D) Thrill in all valve areas: - thrill its palpable murmur ⇒ feel as shivering back of cat. (Feel it especially at first aortic and pulmonary area) .

✱ Location of the valve area for palpation and auscultation

Mitral	left 5 th intercostal space mid clavicular line (apical) .
Tricuspid	left 4 th intercostal space along left sternal border.
Pulmonic	left 2 nd intercostal space at left sternal border.
2nd Aortic	Left 3 th intercostal space at left sternal border.
1st Aortic	right 2 nd intercostal space at right sternal border.

NB:- percussion not necessary her .

3-Auscultation: -

Warm stethoscope and listen for:-

• **S1** ⇒ closure of mitral and tricuspid valve, occur with ventricular contraction.

best heard over mitral and tricuspid area .

Soft ⇒ (M.R, T.R). **loud** ⇒ M.S

NB: - S1 usually not affected in (T.S).

• **S2** ⇒ closure of aortic and pulmonary valve, occur with ventricular relaxation.

best heard over aortic and pulmonary area.

Soft ⇒ A.S, A.R. **Loud** ⇒ systemic HTN, pulmonary HTN

Murmur :- Murmurs are not added sound

Any murmur you have to Comment on the 5 characteristics of murmurs:-

- 1. Location (site) :-** best heard site .
- 2. Timing :-** systolic murmur heard with carotid pulsation, diastolic murmur heard after carotid pulsation.
- 3. Grade = Intensity**
 - Grade I:-** cardiologist + quite room.
 - Grade II:** 4 years' experience.
 - Grade III:** Moderately loud ⇒ heard by student.
 - Grade IV:** Loud and accompanied by thrill
 - Grade V:** very loud with only the rim of the diaphragm is need to hear the murmur.
 - Grade VI:** heard with stethoscope over the chest
- 4. radiation (axilla for MR, carotid for AS, epigastrium for TR)**
- 5. Variation with respiratory phase:-** right side murmurs increase with inspiration , left side murmurs increase with expiration .

Systolic murmur						
	site	radiation	resp	S1	S2	sign
M.R.	Mitral A	Axilla	↑ expiration	soft	no	LVF
T.R	Tricuspid A	epigastrium	↑ inspiration	Normal/soft	no	RVF
VSD	Lower Lt sternal edge	No	no	no change	no	-
A.S.	First aortic A	Carotid/neck	↑ expiration	No change	soft	Slow rising pulse
P.S.	Pulmonary A	no	↑ inspiration	no change	Normal/soft	-

Diastolic murmur						
	site	radiation	resp	S1	S2	sign
M.S	Mitral A	no	↑ expiration	loud	No change	Small volume pulse Malar rash RVF
T.S	Tricuspid A	no	↑ inspiration	normal	No change	↑ canon a wave
A.R	2 nd aortic A	no	↑ expiration	No change	soft	collapsing pulse pulsation over root of the neck
P.R	Pulmonary A	no	↑ inspiration	No change	–	RVF

Valve lesions	murmur
M.S + T.S	Mid diastolic murmur
M.R + T.R + VSD	Pansystolic murmur
A.S + P.S	Ejection systolic murmur
A.R + P.R	Early diastolic murmur

N.B:- in exam just say is it murmurs systolic or diastolic in time.

Adding sound :-

1- S3 ⇒ rapid ventricular filling in diastole, its may normal in (children, young adult, hyper -dynamic state)

abnormal in (H.F, M.R, T.R), occur immediately after S2

• **Gallop rhythm = S3 + tachycardia** ⇒ occur in **H.F.**

2- S4 ⇒ always abnormal, occur due to strong atrial contraction against stiff ventricle, occur just before s1.

E.g. :- (H.F , LVH , HTN, AS) nearly to say any cause of left ventricular hypertrophy.

3- opening snap:- occur in case of sever mitral stenosis, heard in early of diastole due to opening of stenotic valve and disappear when valve become calcified or fibrotic .

4- Clicks:- occur 2nd to valve lesion or valve replacement (metallic click) in prosthetic valve.

Midsystolic click	Mitral valve prolapse (MVP).
Ejection systolic click	A.S , P.S
S1 metallic click	Mitral or tricuspid valve replacement (common mitral)
S2 metallic click	Aortic or pulmonary valve replacement (common aortic .)

Normal comment:-

• **By Inspection:** - there is no obvious chest deformity, no scar, no skin discoloration, no superficial dilated veins, and no obvious pulsation.

By palpation :- apex beat palpated in left 5th inter-costal space mid-clavicular line gentle non sustained , but better to say (I can't determine the character), no left parasternal heave , no thrill all over the valvular area .

By auscultation: - good S1 and S2, no murmur, no adding sound.

✱ Comment of M.R:-

Palpation reveal: - apex beat palpated in left 6th inter costal space along anterior axillary line, (Displaced 2nd to left ventricle dilatation) I can't determine the character(which forceful non-sustained in this case , no left parasternal heave but thrill palpated over mitral area (indicate the murmur grade 4 or more)).

Auscultation :- soft S1 , good S2 , there is murmur systolic in time best heard over mitral area radiating to axilla increased in expiratory phase , no adding sound .

N.B:- in this case S3 may heard by bell over mitral area but in exam better to say (no adding sound) b/c, S3 difficult to heard by student.

✱ comment of A.S :-

Palpation: - apex beat palpated at left 5th inter costal space mid-clavicular line I can't determine the character (which is forceful sustained her) , no parasternal heave . but thrill palpated over 1st aortic area .

Auscultation :- good S1 ,soft S2 , there is murmur systolic in time best heard in 1st aortic area radiating to neck increased in expiratory phase , on adding sound .

N.B:- in this case systolic click may heard, but in exam better to say (no adding sound) b/c, click due to stenotic valve difficult to heard by student.

✱ Comment of T.R:-

Palpation: - - apex beat palpated at left 5th inter costal space mid-clavicular line I can't determine the character, there is left parasternal heave (due to RVH) , thrill palpated over tricuspid area .

Auscultation:- soft S1 , good S2 , there is murmur systolic in time best heard over tricuspid area radiating to epigastrium increased in inspiratory phase , no adding sound .

✱ comment of M.S :-

Palpation: - apex beat palpated at left 5th inter costal space mid-clavicular line I can't determine the character (which is tapping her), there is left parasternal heave (due to RVH) , thrill palpated over mitral area .

Auscultation :- loud S1 , good S2 , there is murmur diastolic in time best heard by bell in left lateral position over mitral area no radiation increased in expiratory phase , no adding sound (which opening snap in sinus rhythm in this case).

*comment of A.R :-

Palpation:- apex beat palpated in left 6th inter costal space along anterior axillary line,
(Displaced 2nd to left ventricle dilatation) I can't determine the character (which forceful non-sustained in this case), no left parasternal heave but thrill palpated over 2nd aortic area.

Auscultation :- good S1 , soft S2 , there is murmur diastolic in time best heard when pt seating and lying forward over 2nd aortic area no radiation and increase in expiratory phase , no adding sound (which Ejection click ± S3+S4 in this case)

N.B :- all heart sound are high pitched sound heard by diaphragm except (S3 , S4 , mid diastolic murmur of ⇒M.S) which low pitched sound best heard by bell .

* general examination related to CVS :-

A)-Vital sign :-

1- pulse irregular irregular ⇒A. F as in mitral stenosis

- Slow rising ⇒A.S
- Low volume ⇒M.S
- Collapsing pulse ⇒A.R
- Radio femoral delay suspect of coarction of aorta .
- Pulses deficit :- apex beat count more than radial pulse count by 10 beat ⇒in atrial fibrillation

N.B :- for more details in pulse see general examination sheet.

Artery	Surface marking
Radial	At the wrist, lateral to the flexor carpi radialis tendon
Brachial	In the antecubital fossa, medial to the biceps tendon
Carotid	At the angle of the jaw, anterior to the sternocleidomastoid muscle
Femoral	Just below the inguinal ligament, midway between the anterior superior iliac spine and the pubic symphysis (the mid-inguinal point). It is immediately lateral to the femoral vein and medial to the femoral nerve
Popliteal	Lies posteriorly in relation to the knee joint, at the level of the knee crease, deep in the popliteal fossa
Posterior tibial	Located 2 cm below and posterior to the medial malleolus, where it passes beneath the flexor retinaculum between flexor digitorum longus and flexor hallucis longus
Dorsalis pedis	Passes lateral to the tendon of extensor hallucis longus and is best felt at the proximal extent of the groove between the first and second metatarsals. It may be absent or abnormally sited in 10% of

normal subjects, sometimes being 'replaced' by a palpable perforating peroneal artery

2-Blood pressure: - if pt. Complain from dizziness measure BP on standing.

BP on standing normally systolic > 10-15mmhg , diastolic > 5mmhg .

Postural hypotension: - when systolic drop 20-30mmhg.

Pulse pressure = systolic pressure – diastolic pressure .

N.B:- wide pulse pressure occur in $\Rightarrow$ A.R .

B)-position:- pulmonary edema let pt take sime setting position .

C)-face:- malar rash $\Rightarrow$ M.S.

Eye:- xanthlasma, corneal arcus $\Rightarrow$ in hyperlipidemia

Pallor for anemia $\Rightarrow$ precipitate heart failure.

Jaundice $\Rightarrow$ cardiac cirrhosis, prostatic valve (hemolysis)

Sub-conjunctival hge $\Rightarrow$ infective endocarditis .

Mouth :- hygiene $\Rightarrow$ infective endocarditis

cyanosis $\Rightarrow$ acute pulmonary odema.

D)-neck:-JVP $\Rightarrow$ $\uparrow$ in RVF.

Carotid artery $\Rightarrow$ carotid bruit.

E)- hand:- when shaking if you found **1** - dry warm erythematous hand $\Rightarrow$ copd

2 -sweat warm hand $\Rightarrow$ thyrotoxicosis $\Rightarrow$ high C.O.P failure, atrial fibrillation

In case of infective endocarditis:-

splinter Hge.

Osler node $\Rightarrow$ Tender, erythematous, pea-sized nodules seen in the pulp of the fingers.

Janeway lesions $\Rightarrow$ Flat, non-tender red spots found on the palms and soles, they blanch on pressure.

Clubbing of finger .

F)-Forearm :- erythema marginatum , sub-cutaneous nodule $\Rightarrow$ rheumatic fever .

G)-Lower limb :- edema $\Rightarrow$ RVF

Petechial hge $\Rightarrow$ infective endocarditis .

Peripheral pulse .

Examination of the JVP:-

internal jugular vein pressure reflect right atrial pressure.

The patient should be in 45° & the height waves of the JVP should be assessed. The head should be supported on a pillow and turned slightly to left with good light to see the right internal jugular vein. Observe medial to the sternomastoid muscle, Estimate the vertical height in centimeters between the top of the venous pulsation and the sternal angle to give the venous pressure & add 5 cm, (normal JVP = 8-9cm).

N.B:- the distance between right atrium and sternal angle is 5cm that's why we add 5cm in measurement .

✱ **What are the difference between JVP and Carotid pulse by examination?**

JVP	Carotid pulse
More visible than palpable	More palpable than visible
Obstructed by finger pressure	Not obstructed
Varies with posture	No
When venous pressure is high it moves ear lobe	Does not move ear lobe
Decrease with respiration	No
Tow waves of cardiac cycle	Only one per cardiac cycle
More prominent when put pressure on abdomen [hepato-jugular reflex]	No effect by Abdominal pressure

Normal JVP waves :-

a wave ⇒ due to right atrial contraction

c wave ⇒ transmitted pulsation from carotid artery at onset of ventricular systole .

x descent ⇒ is due to atrial relaxation .

v wave ⇒ atrial filling against closed tricuspid valve .

y descent ⇒ opening of the tricuspid valve .

✱ Abnormal JVP waves :-

Absent 'a' wave	atrial fibrillation
Dominant a wave	Pulmonary stenosis Pulmonary hypertension Tricuspid stenosis
Cannon a wave	Complete heart block, Ventricular tachycardia.
Dominant v wave	Tricuspid regurgitation
Absent x descent	Atrial fibrillation

N.B:- kussmauls sign:- is paradoxical rise in JVP on inspiration ⇒ constrictive pericarditis, pericardial effusion.

○ **ECG and X-RAY finding in valvular lesion ⇒ common question in exam.**

Valve lesion	ECG	RADIOGRAPH
Aortic stenosis	• LV hypertrophy; left bundle branch block also common • Rare heart block from calcific involvement of conduction system	• LV prominence without dilation • Poststenotic aortic root dilation • Aortic valve calcification

Aortic regurgitation	LV hypertrophy, often with narrow deep Q waves	LV and aortic dilation
Mitral stenosis	• Left atrial abnormality • Atrial fibrillation common • RV hypertrophy pattern may develop if associated pulmonary arterial hypertension	• Large LA: double-density, posterior displacement of esophagus, elevation of left mainstem bronchus • Straightening of left heart border due to enlarged left appendage • Small or normal size LV • Large pulmonary artery • Pulmonary venous congestion
Mitral regurgitation	• Left atrial abnormality • LV hypertrophy • Atrial fibrillation	• Enlarged LA and LV • Pulmonary venous congestion

⊗VIP questions:-

1 -if you found sign of infective endocarditis what do like to do in abdominal examination?

Answer :- spleen examination (b/c infective endocarditis may associated with splenomegaly)

2 -if your PT have mitral stenosis how to detect the severity and complication clinically ?

by history (direct questions)	By examination
History of hemoptysis ⇒ 2 nd to lung congestion	Auscultate chest ⇒ basal crepitation due to pulmonary edema
Horsens of voice ⇒ 2 nd to pressure of left atrial hypertrophy on left recurrent laryngeal nerve (ortner syndrome).	Examine JVP ⇒ elevated in right side failure due to pulmonary HTN caused by mitral stenosis .
Dysphagia ⇒ 2 nd to pressure of left atrial hypertrophy on esophagus.	Palpate liver ⇒ tender hepatomegaly due to right side failure.(congested liver)
History of thromboembolism as CVA ⇒ 2 nd to atrial fibrillation.	• Do shifting dullness ⇒ ascites 2nd to portal HTN. • Examine lower limb for edema.

3 -How to differentiate between M.R and T.R without auscultation?

Answer: - by JVP and liver examination ⇒ raised JVP and tender pulsatile liver in T.R and not in M.R.

4 -if PT have A.S and M.R and he preparing for surgery for one valve only which valve you should treated first ?

answer:- aortic valve first then mitral to avoid limitation of COP if we treat mitral first.

