Cardiovascular Examination

Cardiovascular Examination

- General examination.
- Precordium examination.

- Blood pressure (supine & erect).
- Signs of heart failure in other organs (lungs, liver, lower limbs)
- Fundus examination (arterial changes, haemorrhages, exudates and papilloedema) in arterial hypertension.

Radial arterial pulse

1. Rate: average =70/min (range: 60-90). increased & decreased in some conditions what are they ?
2. Rhythm.
3. Form of pulse wave.
4. Volume.
5. Vessel wall.
6. Synchronicity with other radial artery delay?
7. Radio femoral delay (aortic coarctation).

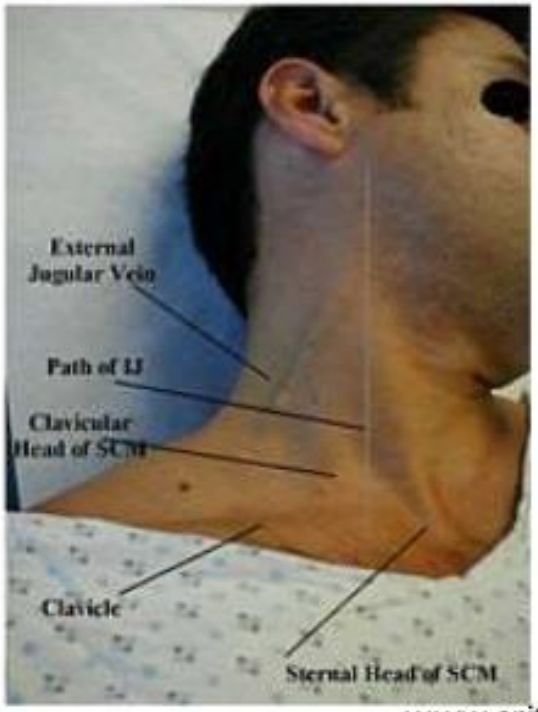
Jagular venous pressure(JVP).

- Position of the patient at (45) degrees.
- Features of JVP, how to differentiate with carotid pulsation in the neck.
- Hepato-jugular reflex’ .
- Waves (a, c, x, v, y)

Carotid artery pulsations	**Jugular venous pulsations**
Rapid outward movement	Rapid inward movement
One peak per heart beat	Two peaks per heart beats (in normal sinus rhythm)
Palpable	Impalpable
Pulsations unaffected by pressure at root of neck	Pulsation diminished by pressure at root of neck
Independent of respiration	Height of pulsation varies with respiration
Independent of position of patient	Varies with position of patient
Independent of abdominal pressure	Rises with abdominal pressure

Cardiovascular Examination

- Jugular venous pressure (JVP)



- JVP reflects central venous or right atrial pressure.
- Normally 9cmH_2O
- Sternal angle approx 5cm above right atrium.
- Normal JVP should be about 4cm above this angle when patient is at 45 degrees

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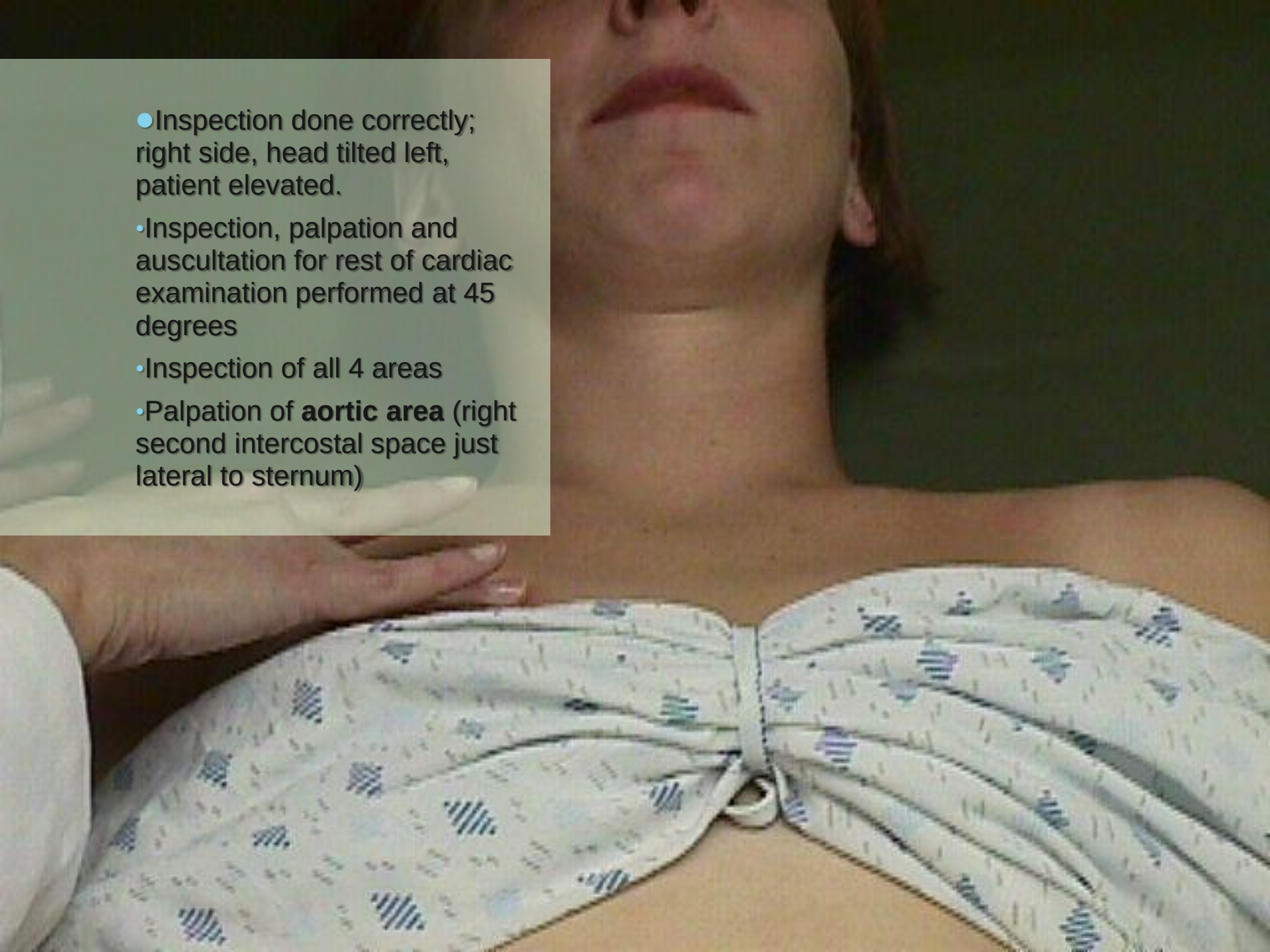
- **Inspection Jugular Vein**

- Inspection of jugular venous pressure should be done with the patient lying with their head tilted to the left side. The patient should be elevated to the point where jugular venous distention is seen in the mid-neck. In a patient with a markedly elevated jugular venous distention, they may actually need to be sitting upright , or in a patient with a low-normal jugular venous pressure this may need to be at 0^{o} to see the distention in the mid-neck.

Heart examination;

- Inspection :

1. Apex beat .
2. left parasternal movement due to right ventricular hypertrophy.
3. pulsation in 2d left ICS 2ry to enlarged PA.
4. epigastric pulsation 2ry to expanded abdominal aorta

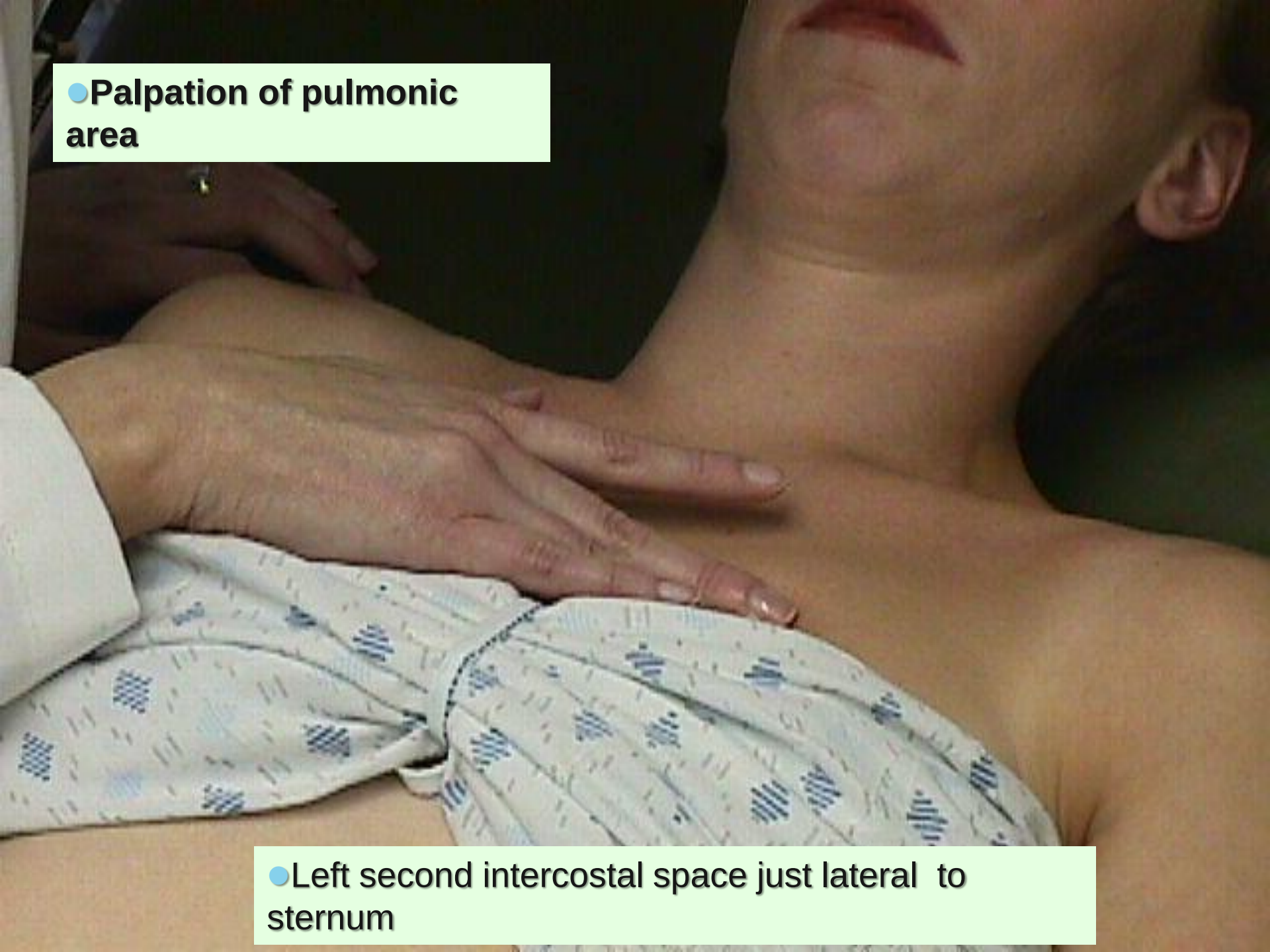


- Inspection done correctly; right side, head tilted left, patient elevated.
- Inspection, palpation and auscultation for rest of cardiac examination performed at 45 degrees
- Inspection of all 4 areas
- Palpation of **aortic area** (right second intercostal space just lateral to sternum)

Cont. heart exam.

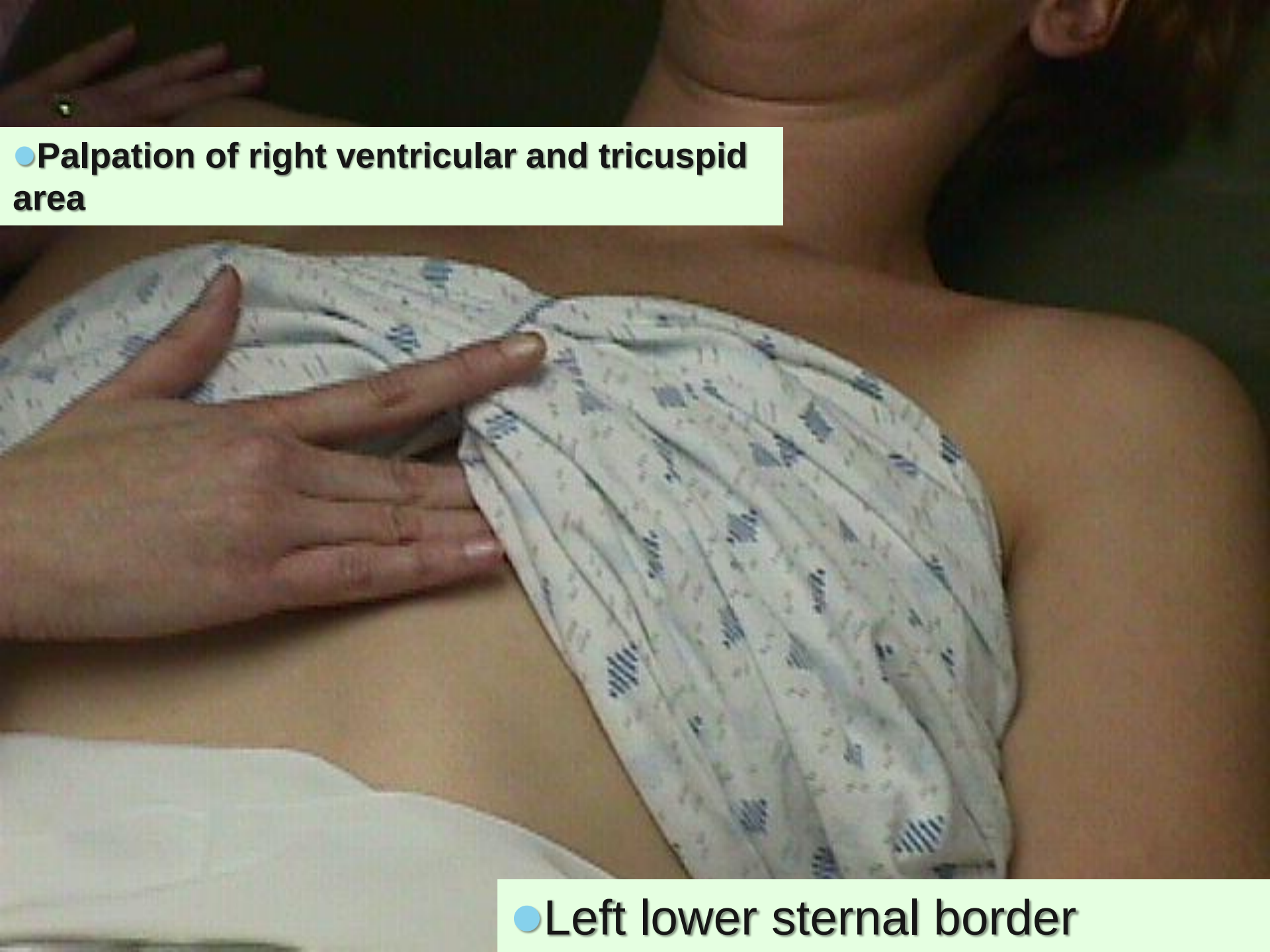
- Palpation :

1. Apex beat 5th ICS midclavicular line.
2. Left parasternal heave 2nd ICS 2ry to RVH.
3. Thrill (vibrating sensation indicates palpable murmur).



- **Palpation of pulmonic area**

- Left second intercostal space just lateral to sternum



- **Palpation of right ventricular and tricuspid area**
- Left lower sternal border

Palpation of apical area

- If apical impulse not palpable, patient in left lateral decubitus
- Palpation done with fingerpads in all 4 areas
- Palpation of apical area (about fifth intercostal space mid-clavicular line)

- **Palpation: Apical Area**
- If apical impulse not palpable, patient in left lateral decubitus

Cont. heart exam.

- Auscultation:

1. bell to detect low-pitched sounds , press lightly against the skin
2. diaphragm detect high-pitched sounds

press firmly against the skin

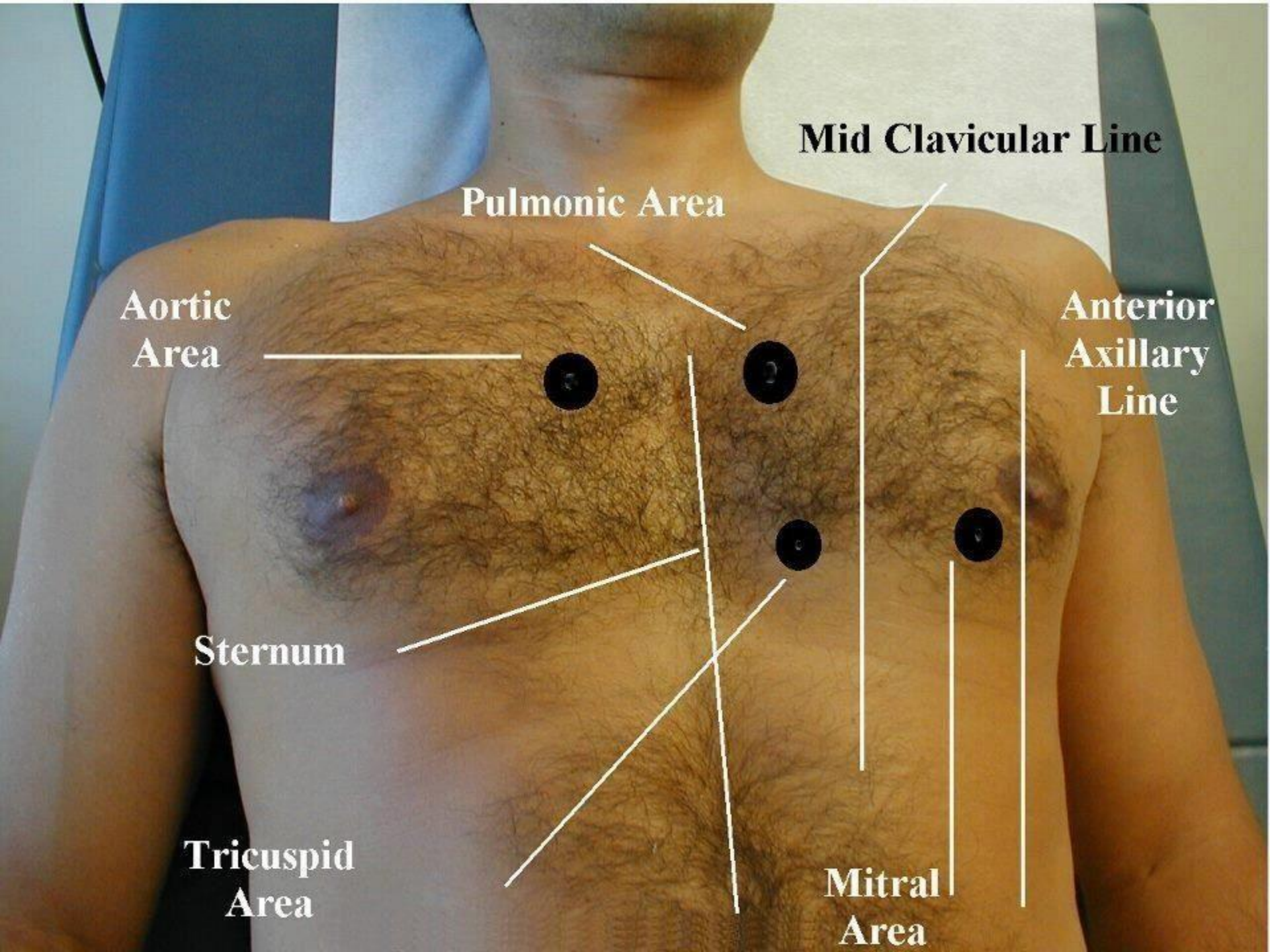
Cont. auscultation

- Normally audible heart sounds:

  1^{st} & 2^{nd} HS
- Added sounds: 3^{rd} & 4^{th} HS, pericardial friction rub (pericarditis), opening snap (m.s), mitral click(m.v.p)
- murmers

- Auscultation with Diaphragm Aortic area
- Auscultation with Diaphragm Pulmonic area
- Auscultation with Diaphragm Tricuspid area (left lower sternal border)
- Auscultation with Diaphragm Mitral area (apical area)

- Auscultation with bell. Mitral area
- Auscultation with bell. Mitral area in the left lateral decubitus position
- Done correctly - Bell applied light pressure, not heavy
- Auscultation with bell. Tricuspid area


Mid Clavicular Line
Pulmonic Area
Aortic Area
Anterior Axillary Line
Sternum
Tricuspid Area
Mitral Area

Murmurs

- Turbulent blood flow caused by diseased valve or if a large amount of blood flows through a normal valve.

- characteristics of murmurs suggest the cause of it (site, radiation, pitch, timing and the intensity) .

- Site; area over which a murmur is best heared depends upon the valve of origin and the direction of the blood flow. (Mitral m.at apex, aortic m.at right 2nd ICS)

- Radiation; occurs along line of blood flow. (AS» neck, AR» left sternal edge.)

- Pitch; the greater the pressure gradient the higher the pitch(MS m.» low-pitched, AR m.» high-pitched)
- Timing; in relation to the1st and the 2nd HS

Systolic; time between 1st and the 2nd HS, could be mid-systolic (AS), pansystolic (MR).

Diastolic; time between 2nd and the 1st HS, can be divided into three phases. Early (AR), Mid-diastole (MS), Presystole.

- Examples of murmurs;

Systolic; MR,TR, AS, PS.

Diastolic; MS,TS, AR, PS.

Continuous; PDA.

- Mitral murmurs: best heard at the apex and radiate to the axilla. Mitral sounds can be accentuated with the patient in the left lateral position. Hence, to listen to a mitral murmur, first listen to the apex, then listen round to the mid-axillary line at the same level. Return the bell to the apex and, keeping it there, ask the patient to lie on the left side. Note the timing of any murmur. Mitral regurgitation produces a pansystolic murmur of roughly even intensity throughout systole. Mitral stenosis produces a diastolic murmur described as presystolic. As soon as the murmur finishes, the first sound is heard. Mitral valve prolapse produces a mid-systolic click.

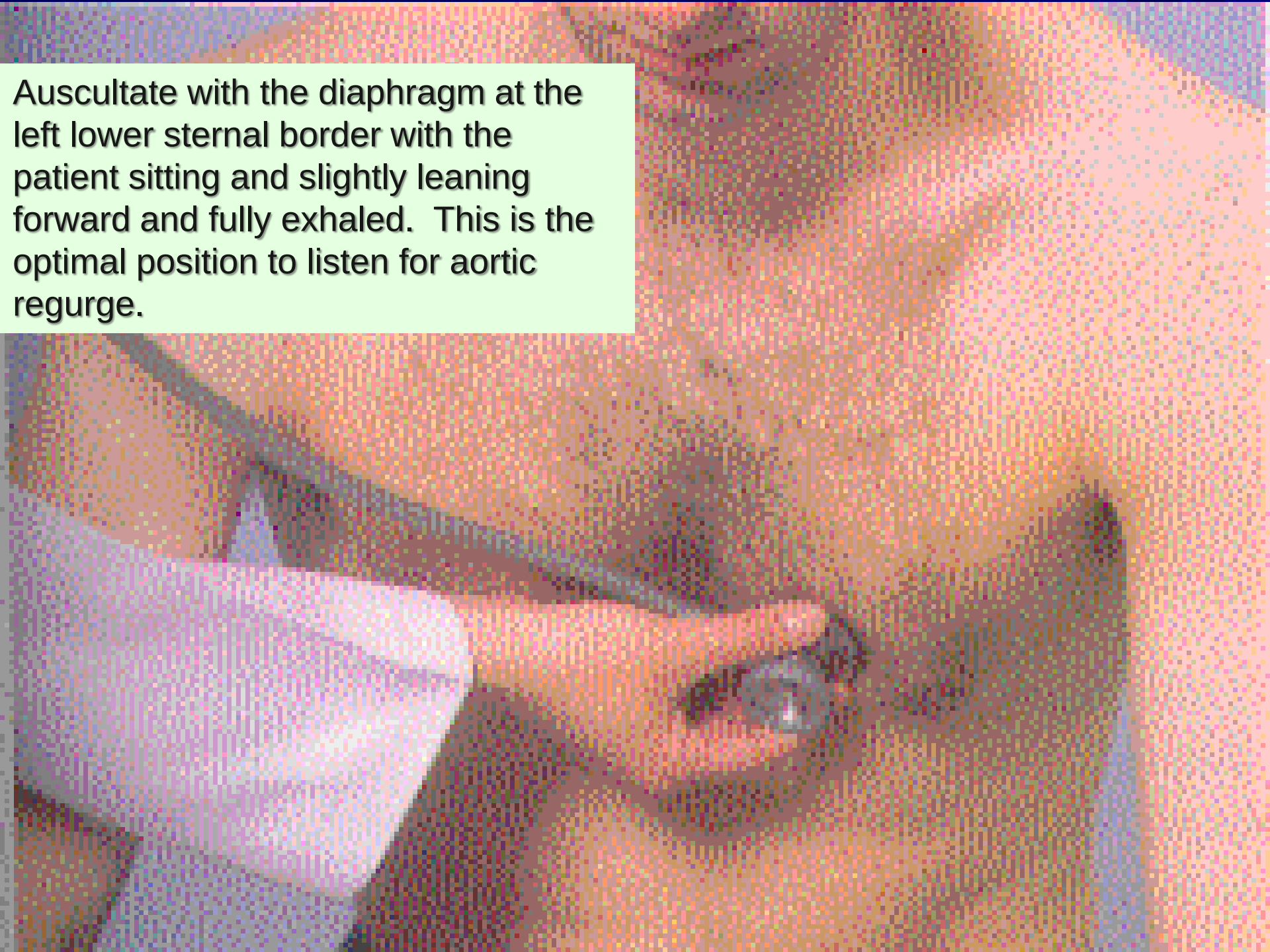
- Tricuspid murmurs: uncommon. The timing is as for mitral murmurs but they are best heard at the lower right sternal edge. Tricuspid stenosis is very rare. Regurgitation may occur in right ventricular hypertrophy and dilated cardiomyopathy. It will produce a marked wave on the JVP. Tricuspid regurgitation will not radiate to the axilla.

- Pulmonary murmurs: The pulmonary and aortic valves are both best heard in the 2nd intercostal space, to the left and right respectively. This can make differentiation quite difficult. Sound from the aortic valve is often transmitted to the carotid and can be heard by placing a stethoscope over the carotid bifurcation. Pulmonary stenosis will produce a flow murmur that gets louder then softer (crescendo-decrescendo) during systole. Pulmonary ejection sounds, unlike aortic ones, tend to diminish or disappear in inspiration. A similar sound occurs with aortic stenosis but it is transmitted to the carotids.

- Aortic murmurs: Aortic sclerosis occurs in the elderly and produces a murmur similar to aortic stenosis but it is poorly transmitted or not transmitted to the carotids. It is transmitted to the apex and the mid-axillary line. In aortic stenosis, A2 is soft. In aortic sclerosis, A2 is normal or loud. Systolic murmurs in the elderly are quite common. They indicate cardiac disease and are associated with increased cardiac mortality. Pulmonary or aortic regurgitation produces an early diastolic murmur, as this is when the arterial pressure is at its height. An aortic murmur of regurgitation is best heard using the diaphragm of the stethoscope with the patient sitting forward in full expiration. Ask the patient to sit forward, and put the stethoscope in place. Say, 'Take a big breath in - breathe right out - and hold it'. This will give a few seconds to listen for the murmur. Few people can hold their breath in full expiration for more than a few seconds, especially if unfit.

- Not all murmurs arise from valves. Some are flow murmurs where rapid flow during ejection causes turbulence, especially at the pulmonary or aortic outlet. This occurs in a hyperdynamic state as in anaemia, severe thyrotoxicosis or possibly with fever. It may also occur in pregnancy but it is essential to exclude cardiac disease

- Atrial septal defect (ASD) with a significant left to right shunt will produce a pulmonary flow murmur. The murmur does not originate from the atria and, unless there is a significant shunt, there may be no murmur. Ventricular septal defect (VSD) produces a harsh systolic murmur, heard best along the left sternal edge. It may be necessary to auscultate all along the line to find it if it is small. There is little correlation between the size of VSD and the intensity of the murmur.


Auscultate with the diaphragm at the left lower sternal border with the patient sitting and slightly leaning forward and fully exhaled. This is the optimal position to listen for aortic regurge.

Mitral stenosis: in left lateral decubitus position, listen with the bell over the 5th intercostal space

THANK YOU