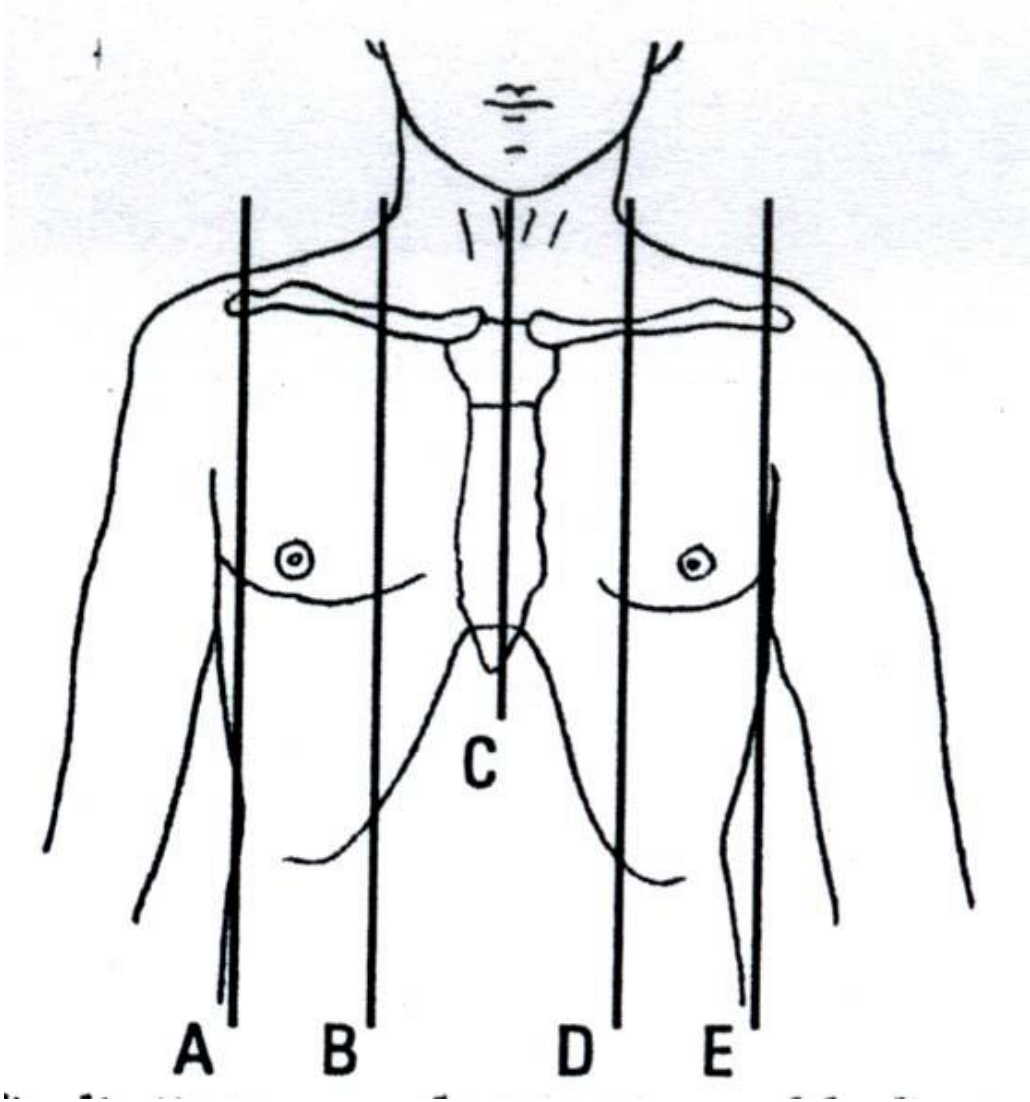
Examination of cardiovascular system

IInd Chair and Clinic of Cardiology

Chest topography

A Right anterior axillar
B Right midclavicular
C Sternal
D Left midclavicular
E Left anterior axillar

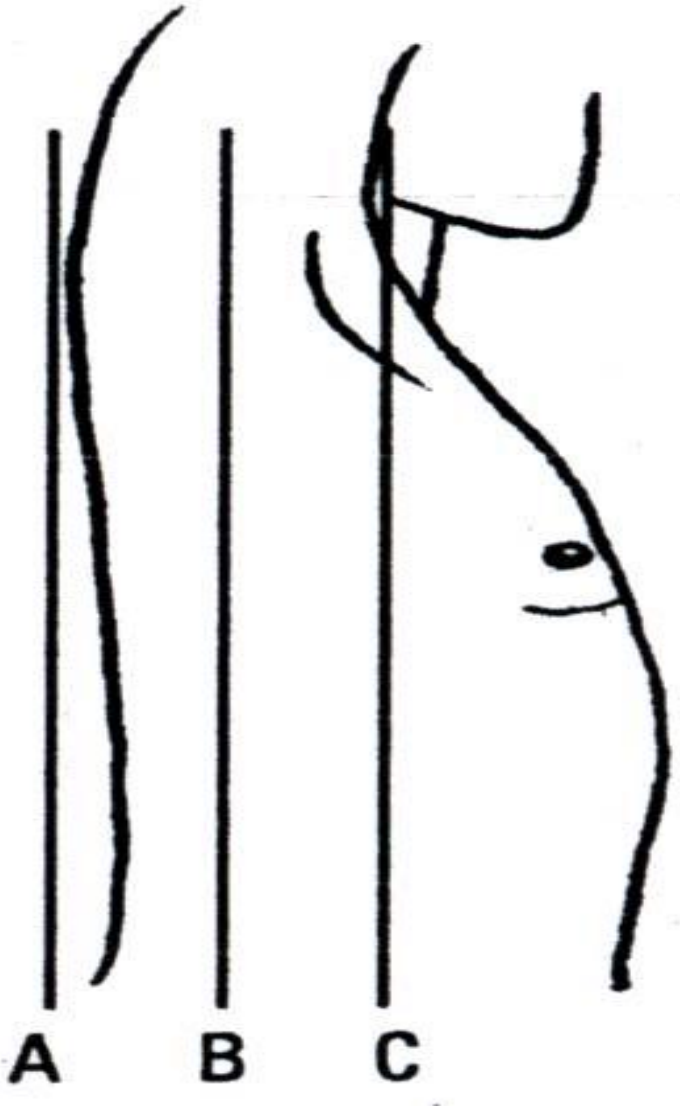


Chest topography

A Posterior axillar

B Middle axillar

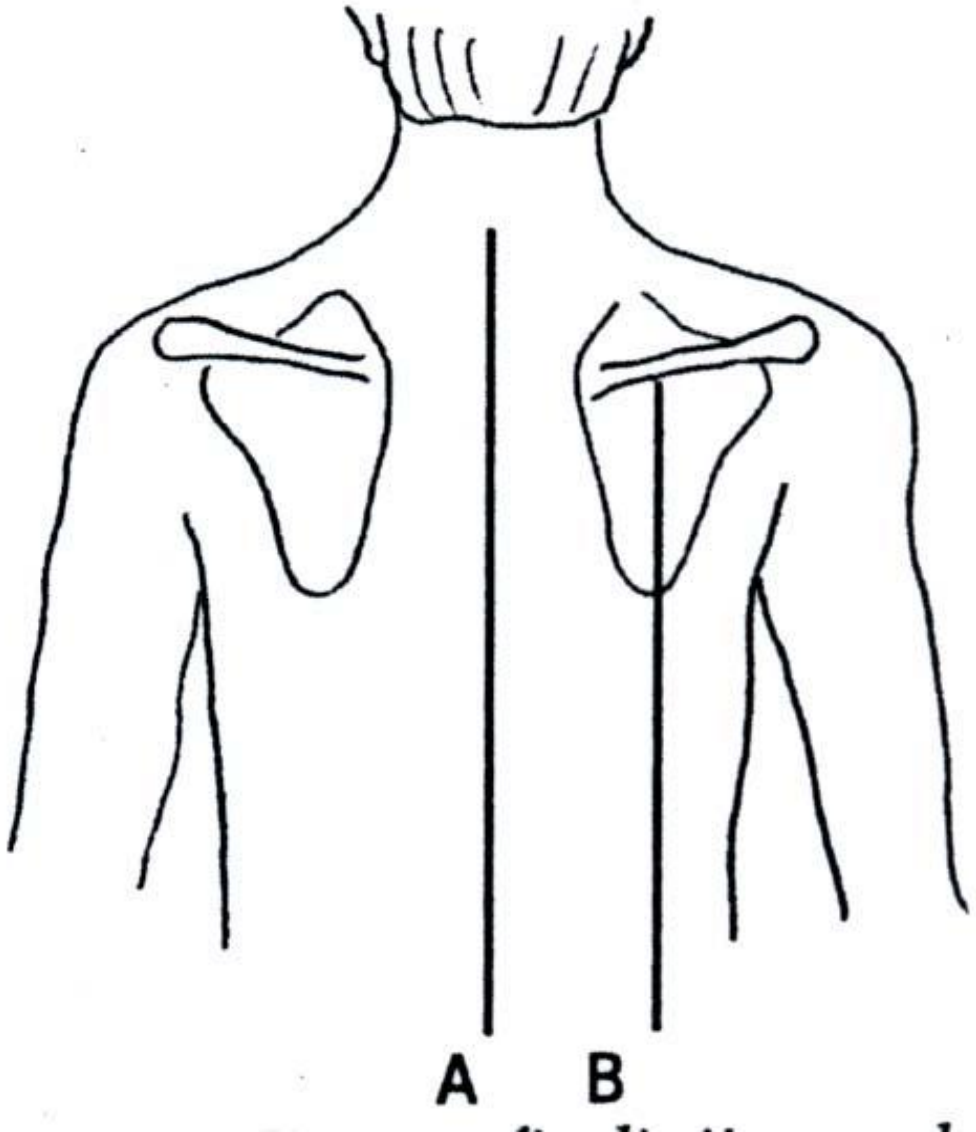
C Anterior axillar



Chest topography

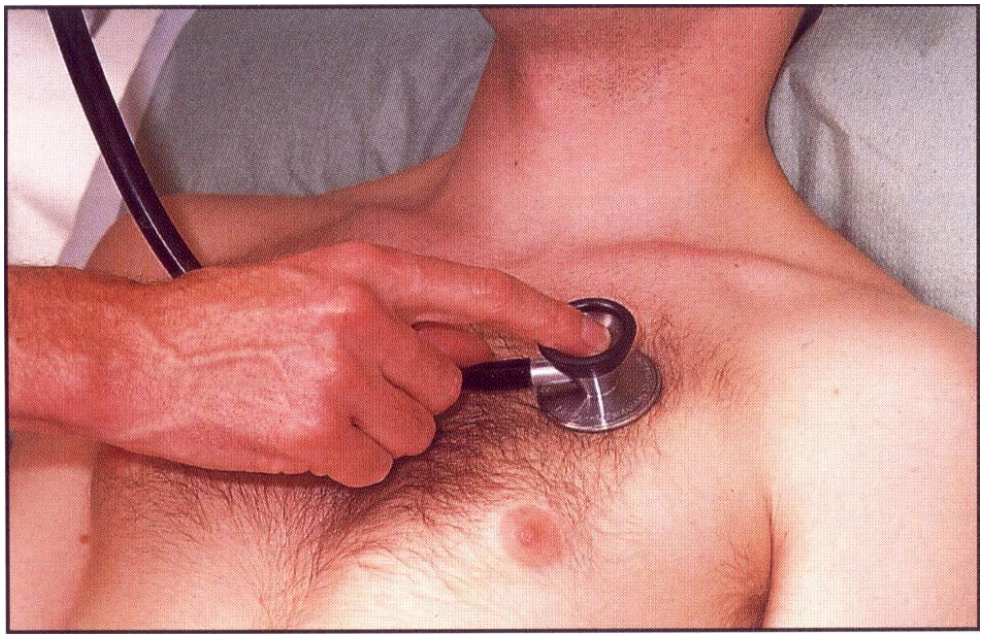
A Vertebral line

B Scapular line



Examination techniques

- Visual inspection
- Palpation
- Percussion
- Auscultation
- Measuring



Visual inspection

- Shape of the chest: anatomy, pathologic disfigurement
- Breath frequency
- Breath rhythm
- Proportion od inspiration and expiration(norm 2:3)
- Breath depth, amplitude and symmetry of respiratory movement, respiratory muscles effort

Chest disfigurement

Kyphoscoliosis

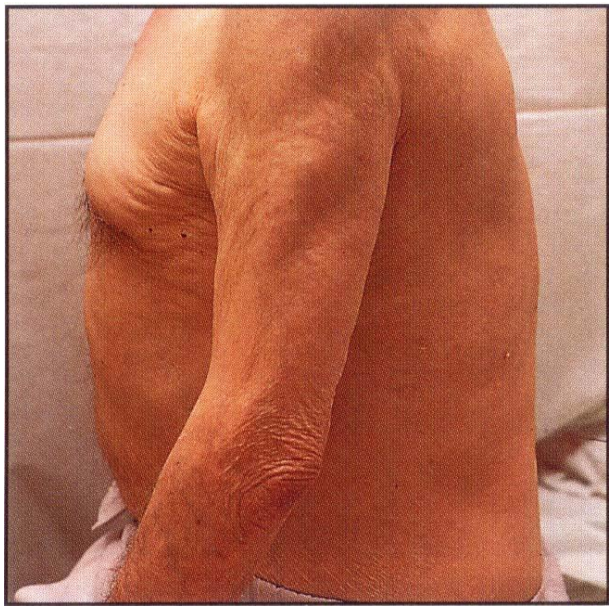
Kyphoscoliosis

Consequences

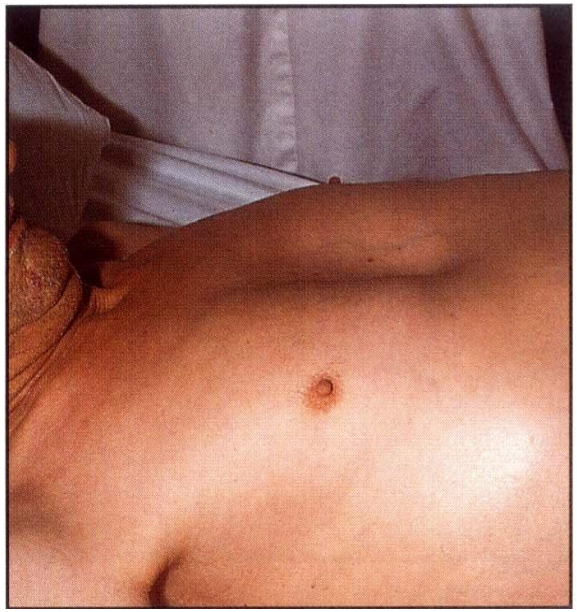
Kyphoscoliosis – is one of the causes of *cor pulmonale* (chronic cardio-pulmonary syndrome, right heart insufficiency).

- Impaired respiratory gas exchange
- Right ventricle hypertrophy and insufficiency
- Dyspnea, cough
- Cyanosis
- Liver enlargement
- Swelling

Other chest disfigurement

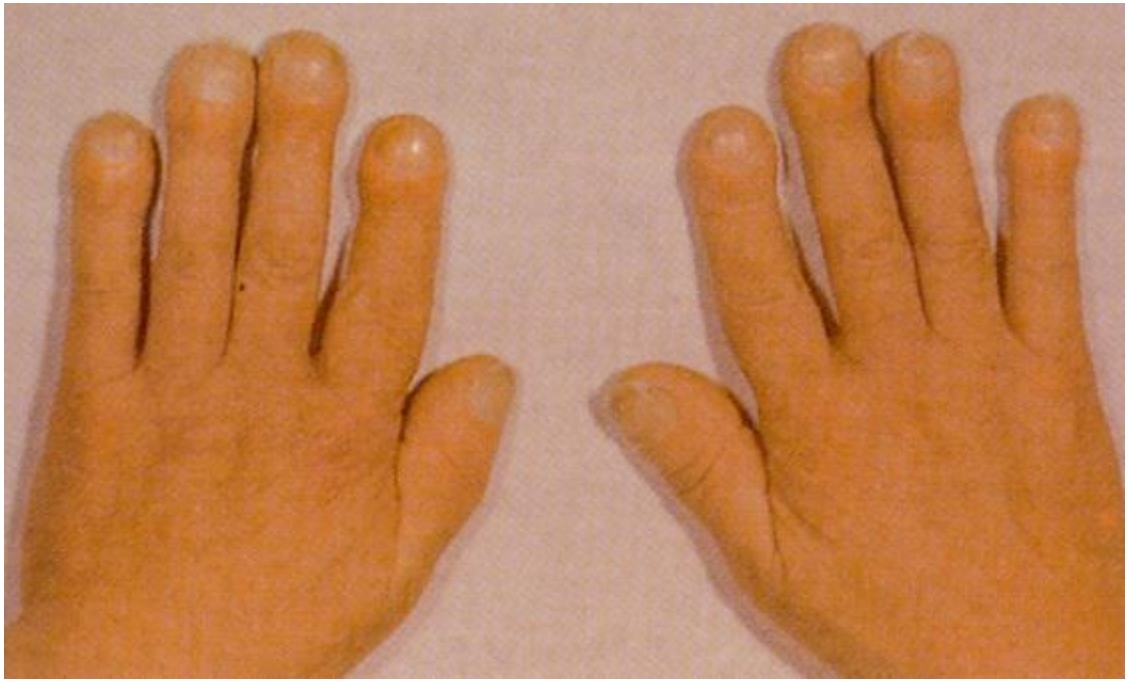


Barrel chest - pulmonary emphysema



Funnel chest

Drumstick fingers – digital clubbing



Drumstick fingers - congenital, cyanotic heart defects, infective endocarditis, chronic respiratory diseases

Arachnodactyly– Marfan Syndrome

Aortic dissection

Aortic aneurysm

Aortic valve regurgitation

Palpation – apical impulse (apex beat)

- V left intercostal space, 1 cm medial to left midclavicular line
- Brief, early, systolic outward thrust occupying the area of 0.5-2 cm and lasting about 2/3 of systole
- Lateral and inferior displacement together with larger area of pulsation indicate left ventricular enlargement or hypertrophy

Substernal area

- It is examined by placing one hand in the mid-epigastric region
- Pulsation in this area – aorta, right ventriclw, liver
- Excessive pulsation
  - Aortic aneurysm
  - Right ventricle enlargement
  - Aortic regurgitation

Percussion

At present, percussion of the heart area is no longer performed, beacuse more accurate diagnostic methods are available to assess cardiac anatomy.

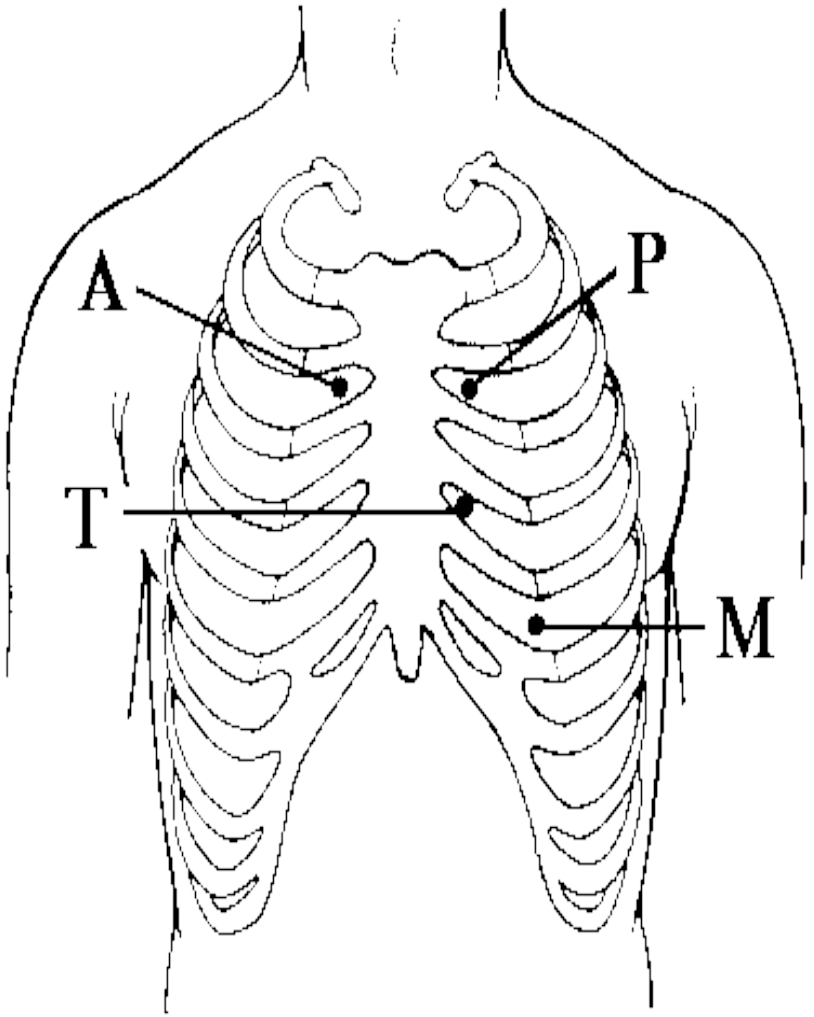
Auscultation

A- aortic valve

P – pulmonic valve

T – tricuspid valve

M – mitral valve



Heart rate

- Should be counted for one minute
- Norm – 60-100/min, regular
- < 60/min – bradycardia
- >100/min – tachycardia

Regularity of the sinus rhythm

- Beats are separated by regular intervals
- Heart tones are equaly loud
- Physiologic sinus arrhythmia – reflex acceleration of the heart rhythm at inspiration and slowing down at expiration
- Extrasystole – additional beats
- Absolute irregularity– probably atrial fibrillation

Auscultation – heart sounds

- First sound (S_1) – closing of the atrio-ventricular valves
- Mitral sound is slightly louder
- First sound is loudest at the apex

Auscultation – heart sounds

- Second sound (S_2) – closing of the semilunar valves
- Pulmonic valve closes slightly later and this delay is larger at the peak of inspiration
- Second sound is loudest at the base of the heart

Pathologic sounds

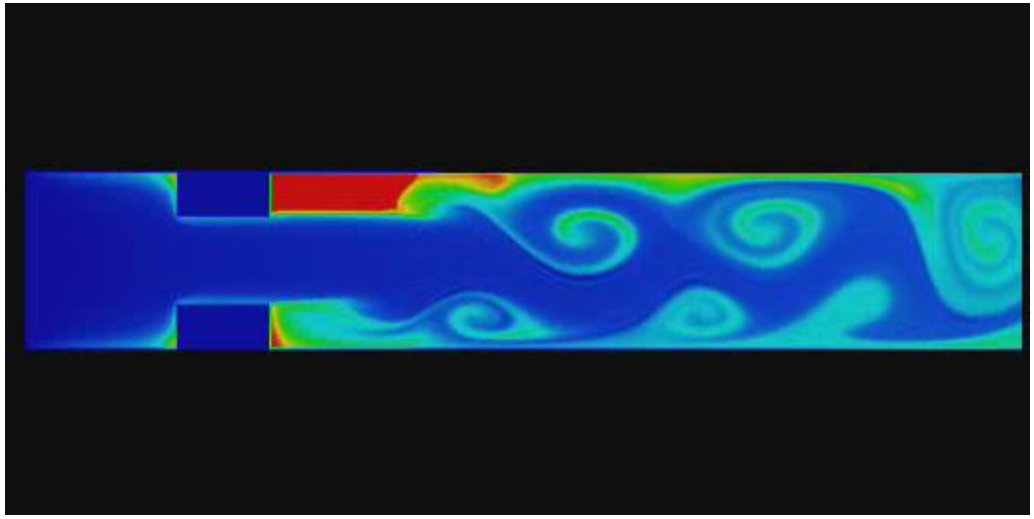
- Third sound (S_3) – early diastolic sound
- Vibration caused by the rapid ventricular filling during early diastole
- Caused by the stiffness of the injured cardiac muscle or larger blodd volume entering the ventricle
- Usually associated with severe heart disease
- Extremely rarely may be present in healthy children and teenagers
- It is a part of so called early diastolic gallop (ventricular gallop) $S_1 – S_2 – S_3$

Pathologic sounds

- Fourth sound(T_4) – late diastolic (presystolic) sound
- It occurs at the end of diastole, during atrial contraction
- Caused by ventricular stiffness
- More difficult to hear than third sound
- I is a part of presystolic gallop (atrial gallop) S_1 – S_2 – S_3
- If there are two pathologic sound it is called a summation gallop or quadruple gallop – S_1 – S_2 – S_3 – S_4.

Murmurs

They occurs when laminar flow turns turbulent and may be encountered in the following situations:



- Excessive blood flow through the unchanged vessel (hyperkinetic circulation) – pegnancy, anaemia
- Blodd flow through the narrowed place(valves or vessels)
- Regurgitations
- Flow through the abnormal connections(septal defects)

Systolic murmurs

- Aortic stenosis – a murmur heard over the aortic valve area, radiating along the carotid arteries
- Mitral regurgitation – a murmur at the heart apex, radiating toward the armpit
- Ventricular septal defect – along the left sternal border

Diastolic murmurs

- Mitral stenosis – At the heart apex, low-frequency murmur, not radiating
- Aortic regurgitation – over the aortic valve area

Pericardial friction rub

- Caused by pericarditis leading to the friction between two pericardia layers covered with fibrin
- Heard over a very limited area, usually at the left sternal border
- This sounf is enhanced in the knee-elbow position and during breath holding