

# UNIT-I

# Cardiovascular system analysis to clinical conditions

Clinical Physiology

Course No. – VPY- 607

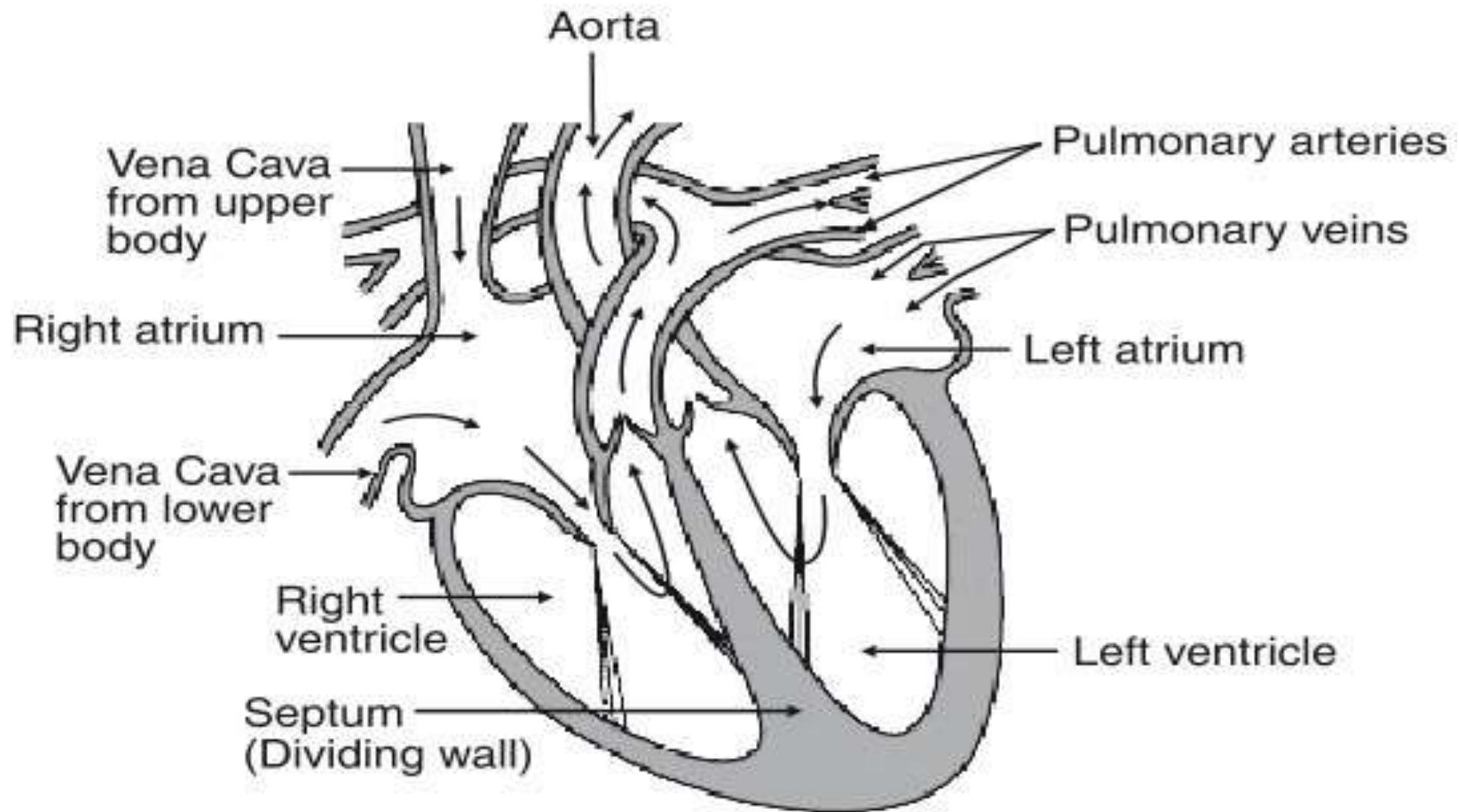
Credit Hrs. – 2+1=3

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**The Heart**

- The evaluation of the cardiovascular system includes a detailed examination of the heart and the peripheral arterial and venous circulations and different laboratory studies.
- In addition to the electrocardiogram and chest x-ray, the availability of sophisticated non-invasive techniques have significantly enhanced the clinical work-up of the patient with a cardiovascular problem.
- A careful assessment will enable to identify the etiologic, anatomic and physiologic components of a specific cardiovascular disorder as well as to determine overall cardiac function.

**Chest pain or discomfort** has numerous cardiac causes like myocardial ischemia, pericarditis, pulmonary embolism, aortic dissection as well as non-cardiac etiologies like anxiety, cholecystitis, pneumonia. The pain of myocardial ischemia, characterized by a squeezing, strangling or burning sensation must be differentiated from pleuritic pain, which is sharp, stabbing, intensified by inspiration and relieved by sitting up. Pleuritic pain usually accompanies pericarditis and pulmonary embolism.

**Dyspnea** of cardiac origin is distinguished from dyspnea due to pulmonary disease. Cardiac dyspnea, includes paroxysmal nocturnal dyspnea (breathlessness at night) is characteristically related to effort until the advanced stages of heart disease when it may become present at rest. Rapid progression of respiratory distress may result in acute pulmonary edema, i.e., asthmatic wheezes and a pink, frothy sputum.

**Syncope of cardiac origin** may be due either to an inability of the heart to maintain adequate cardiac output for a given level of activity or to a dysrhythmia that results in sudden loss of cardiac output. Left ventricular outflow tract obstruction (aortic stenosis or hypertrophic cardiomyopathy) commonly causes effort syncope, whereas syncopal episodes due to dysrhythmias can occur either at rest or during activity.

**Edema** is a detectable excess of fluid in the interstitial spaces, is most commonly located in the ankles and feet and is referred to as peripheral or ankle edema. When due to cardiac disease, it is usually a late sign of congestive heart failure.

## Physical Examination:

The examination involves inspection, palpation and auscultation of the heart, arteries and veins. The *cardiac examination* consists of evaluation for

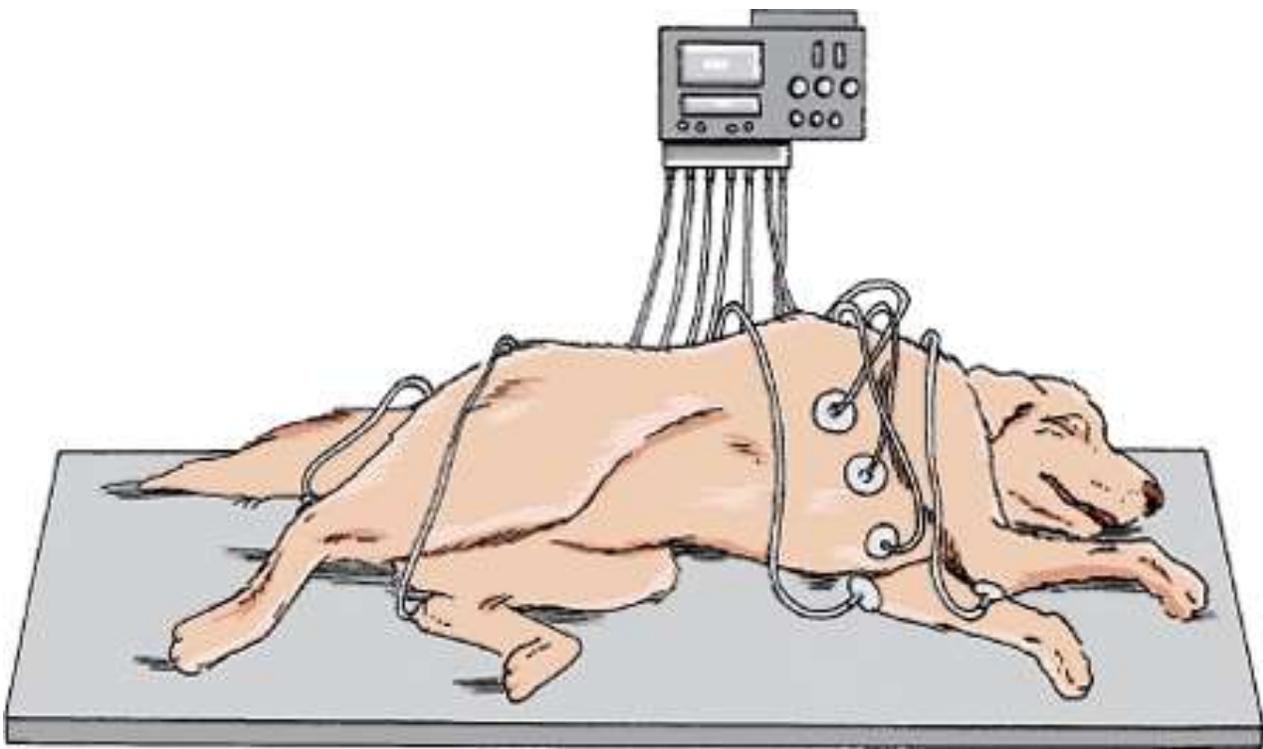
- the carotid arterial pulse and auscultation for carotid bruits
- the jugular venous pulse and auscultation for cervical venous hums
- the precordial impulses and palpation for heart sounds and murmurs
- The evaluation of the *peripheral arteries*, the aortic pulsation, elicitation of pulsus alternans completes the cardiovascular examination

## **Examination of the Heart:**

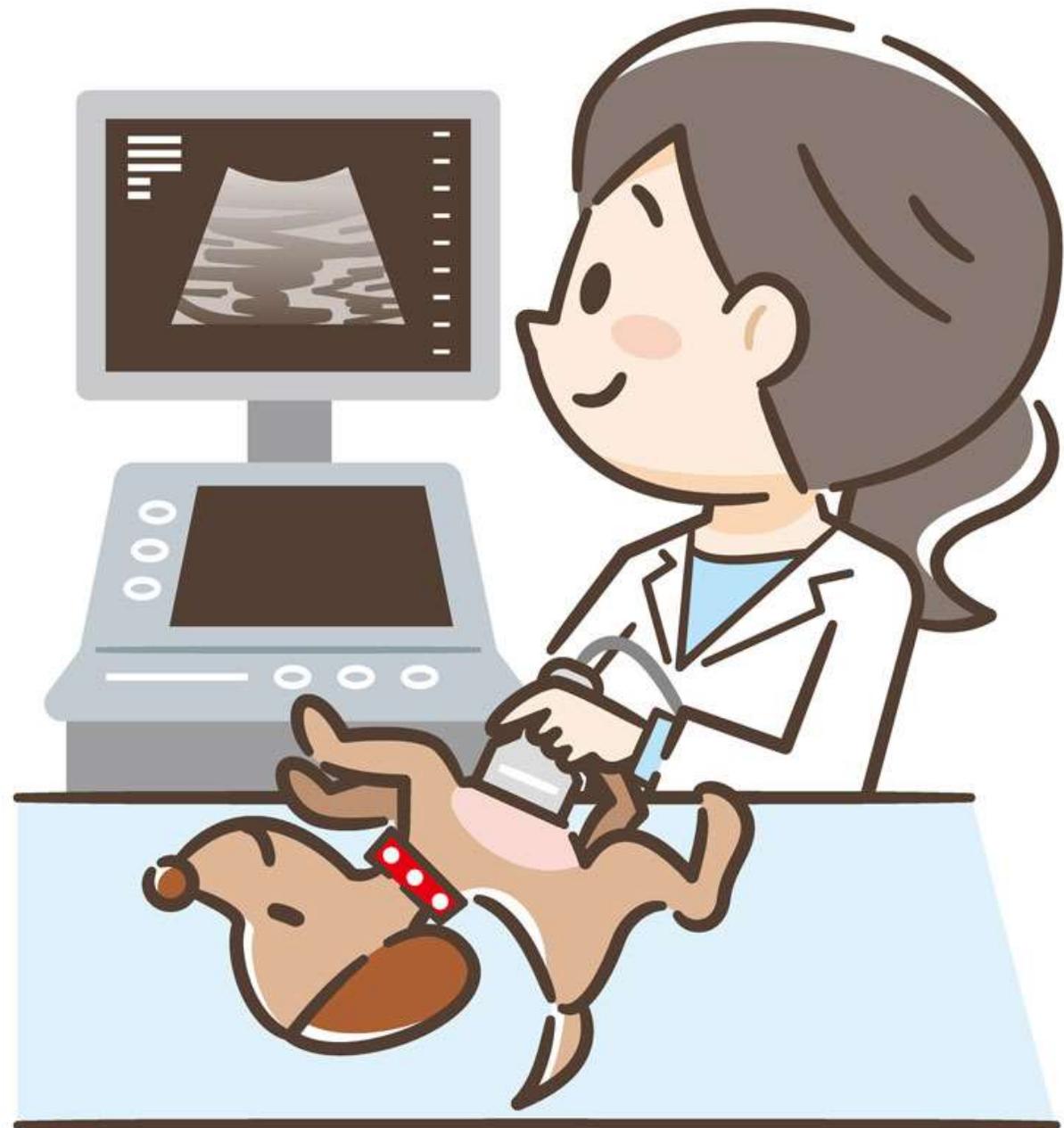
- Carotid Arteries** - Begin the cardiovascular examination by assessing the carotid arterial pulses. They are ordinarily examined while the patient is breathing normally.
  
- Jugular Veins** - It includes observation of venous wave form, assessment of the response of the venous pressure to abdominal compression, estimation of the central venous pressure and auscultation for cervical venous hums.
  
- Abdominal pressure** - may also be used to distinguish venous from arterial neck pulsations.
  
- Precordial Movements and Thrills** - The precordial examination, performed next, consists of inspection and palpation of the anterior chest wall. Precordial movements should be evaluated at the apex (left ventricle), lower left parasternal edge (right ventricle), upper left (pulmonary artery) and upper right (aorta) parasternal edges, and epigastric and sternoclavicular areas.

## □ Heart Sounds and Murmurs –

- Auscultation of the heart is performed after examining the jugular venous pulse, carotid pulse and precordial movements.
- Murmurs are prolonged series of auditory vibrations that should be characterized according to
  - timing in the cardiac cycle (systolic, diastolic, continuous)
  - intensity (loudness)
  - frequency (pitch)
  - configuration (shape)
  - duration (long or short)
  - radiation (to other auscultatory areas)
  - variation, if any, with respiration or other manoeuvres.



Electrocardiogram



Electrocardiograph

□ **Examination of the Peripheral Arteries** - Palpation of the peripheral arteries may yield the following information:

- frequency and regularity of the pulsations
- condition and patency of the peripheral arteries
- characteristics of the arterial pulse wave.

□ **Examination for Thrombophlebitis** - Thrombophlebitis refers to venous inflammation with secondary thrombosis of the involved vein.

## **Conclusion:**

The traditional process of history taking and physical examination together with selective modern laboratory technology will enable the clinician to observe an accurate diagnosis, estimate the degree of severity, interpretation a logical plan of treatment and better understand the pathophysiologic abnormalities of the patient with a cardiovascular problem.