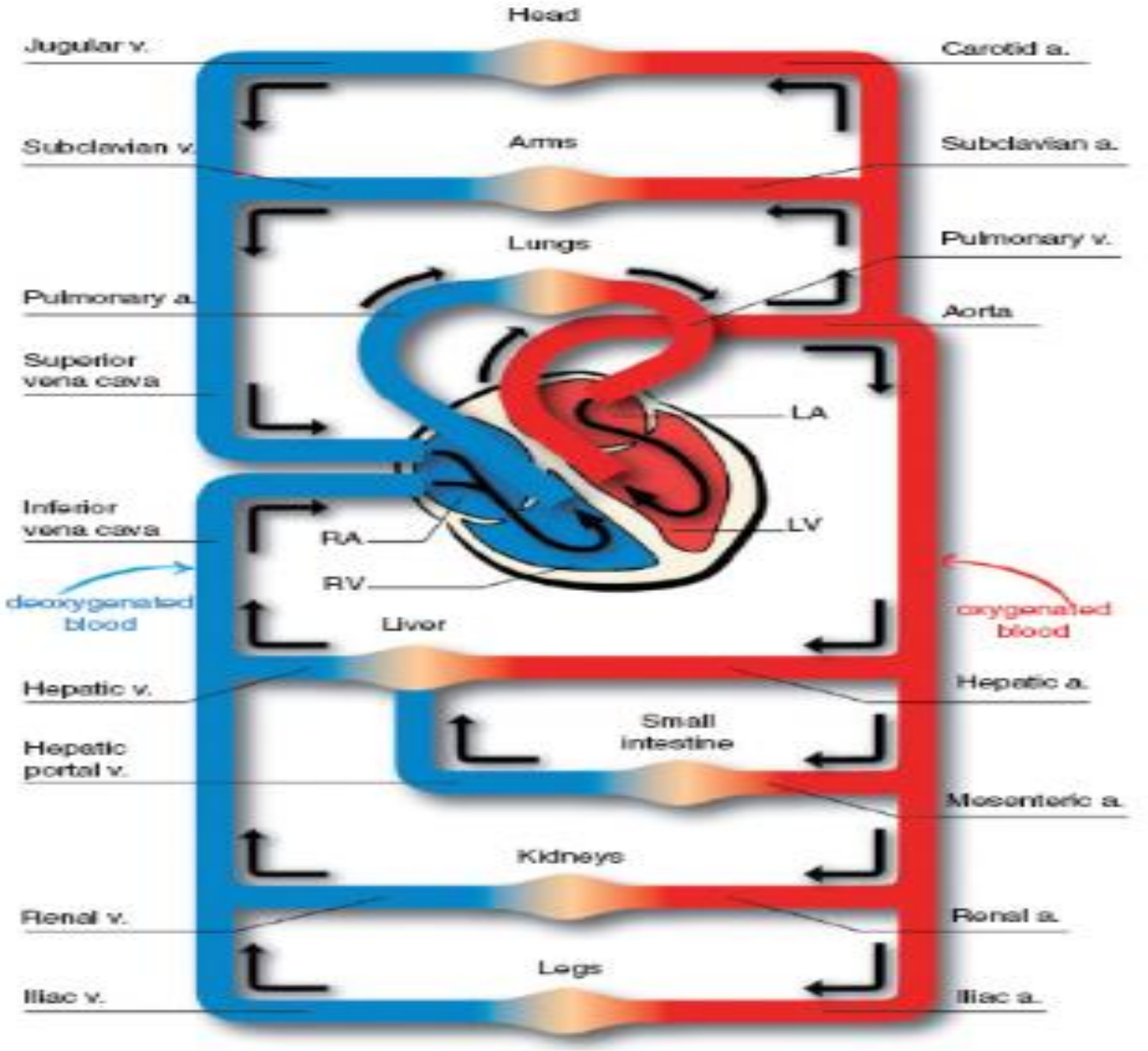
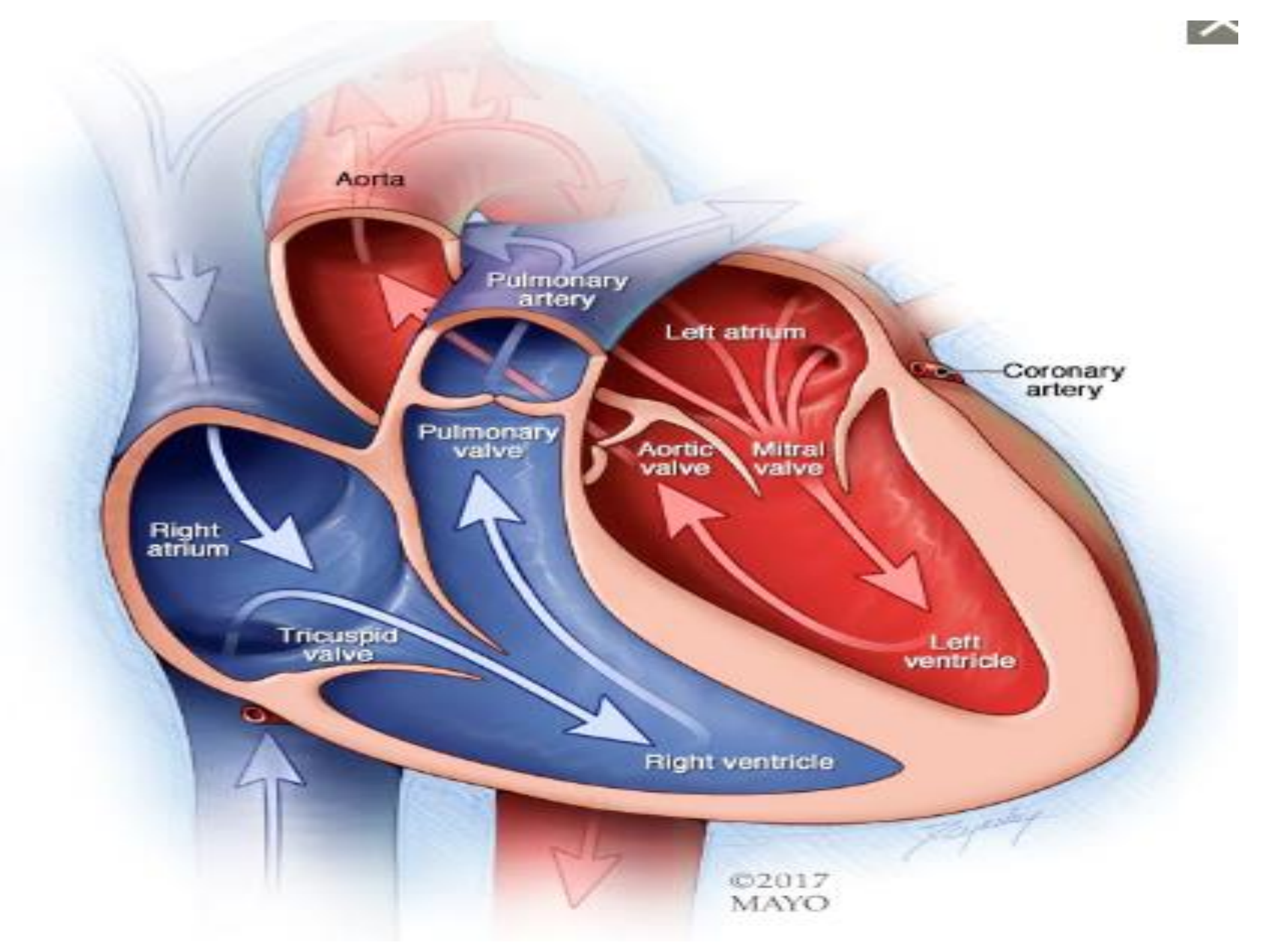
Cardiovascular history

Prof. Dr. Amal Abdelfattah

Professor and head of internal medicine department

STRUCTURE AND FUNCTION OF HEART AND BLOOD VESSELS


Head
Jugular v.
Carotid a.
Subclavian v.
Arms
Subclavian a.
Lungs
Pulmonary v.
Pulmonary a.
Aorta
Superior vena cava
LA
Inferior vena cava
RA
LV
RV
deoxygenated blood
oxygenated blood
Liver
Hepatic v.
Hepatic a.
Small intestine
Hepatic portal v.
Mesenteric a.
Kidneys
Renal v.
Renal a.
Legs
Iliac v.
Iliac a.


Aorta
Pulmonary artery
Left atrium
Coronary artery
Pulmonary valve
Aortic valve
Mitral valve
Right atrium
Tricuspid valve
Left ventricle
Right ventricle
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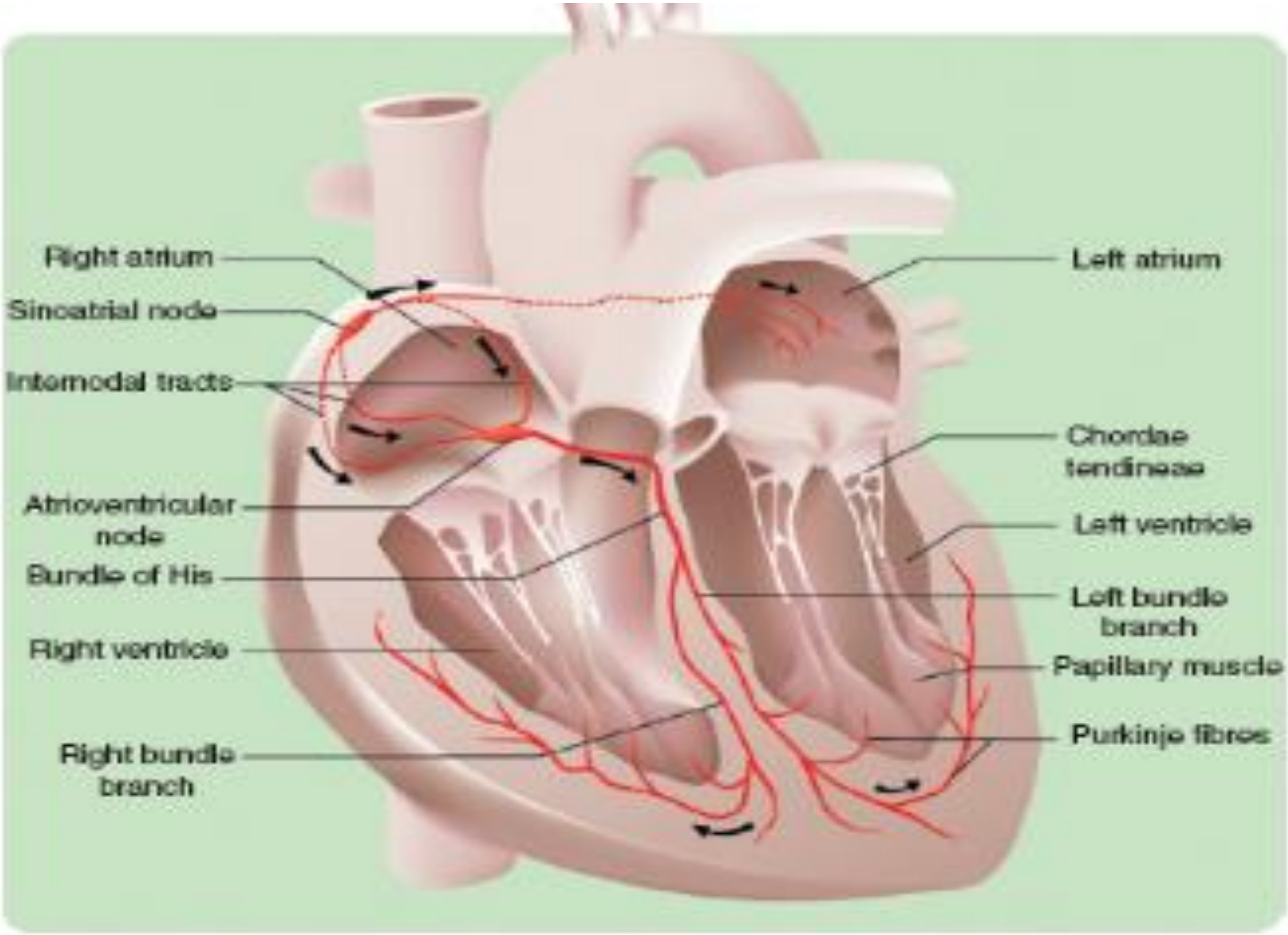
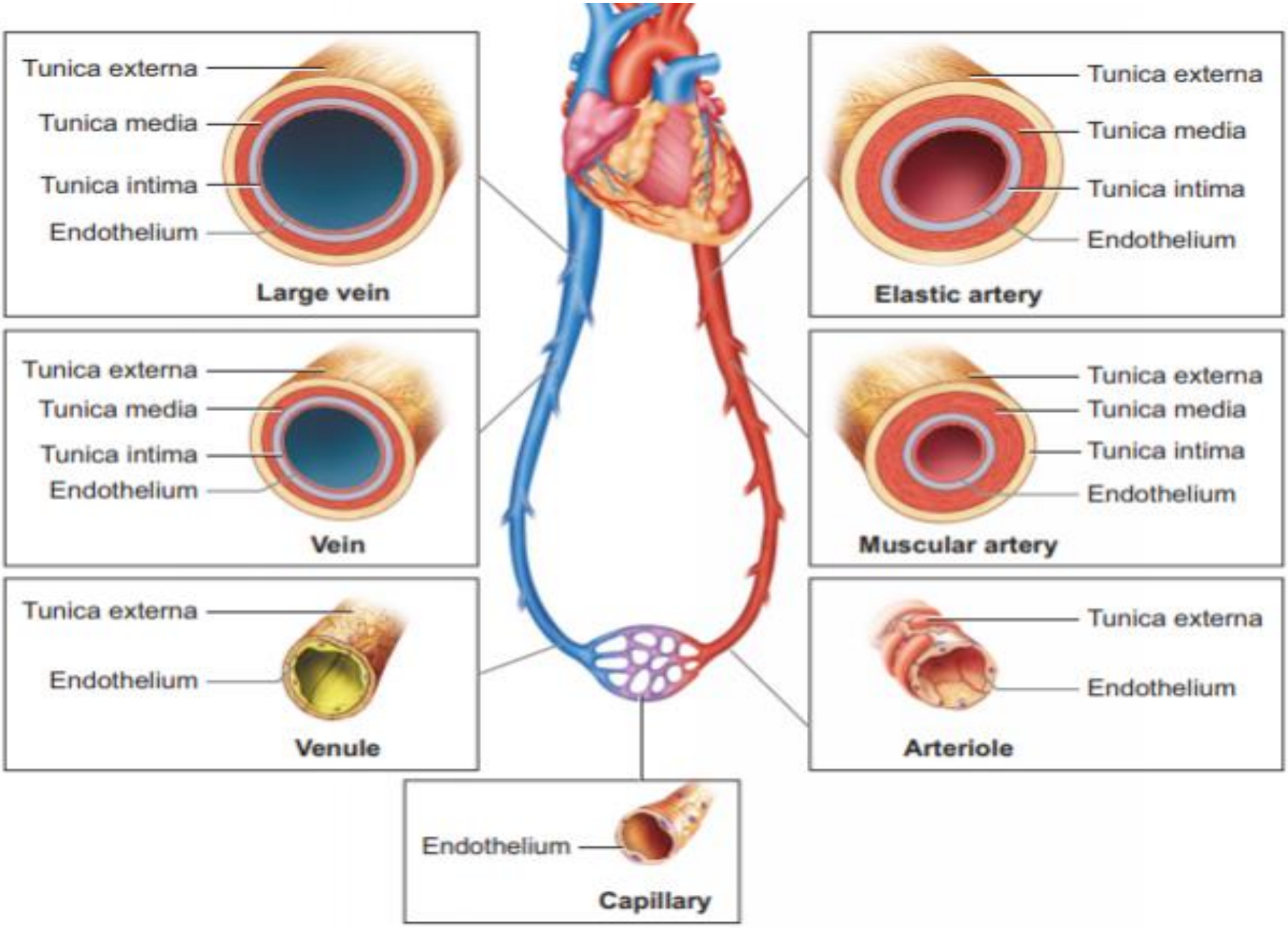

Right atrium
Sinoatrial node
Internodal tracts
Atrioventricular node
Bundle of His
Right ventricle
Right bundle branch
Left atrium
Chordae tendineae
Left ventricle
Left bundle branch
Papillary muscle
Purkinje fibres

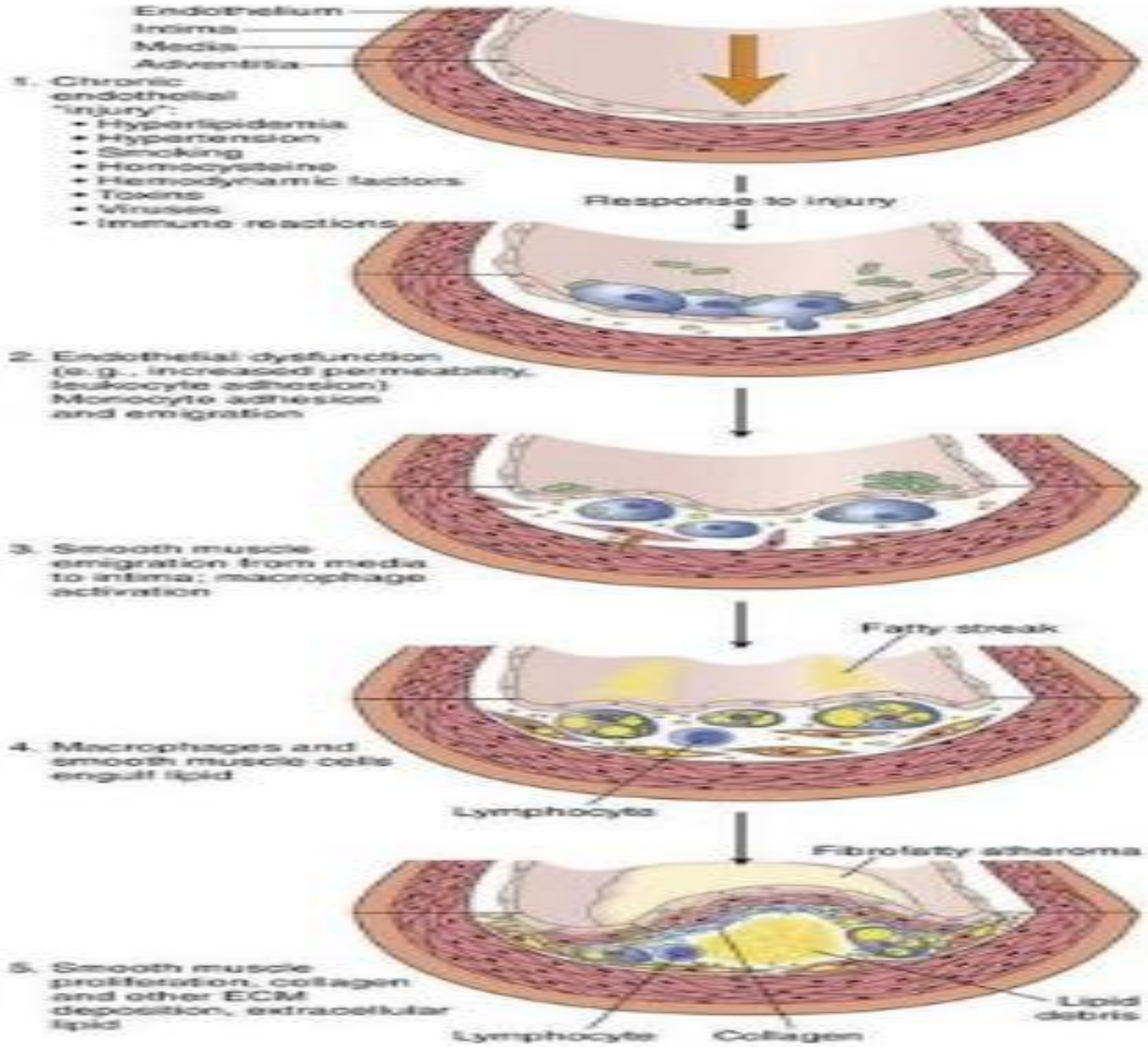

Tunica externa
Tunica media
Tunica intima
Endothelium
Large vein
Tunica externa
Tunica media
Tunica intima
Endothelium
Elastic artery
Tunica externa
Tunica media
Tunica intima
Endothelium
Vein
Tunica externa
Tunica media
Tunica intima
Endothelium
Muscular artery
Tunica externa
Endothelium
Venule
Tunica externa
Endothelium
Arteriole
Endothelium
Capillary

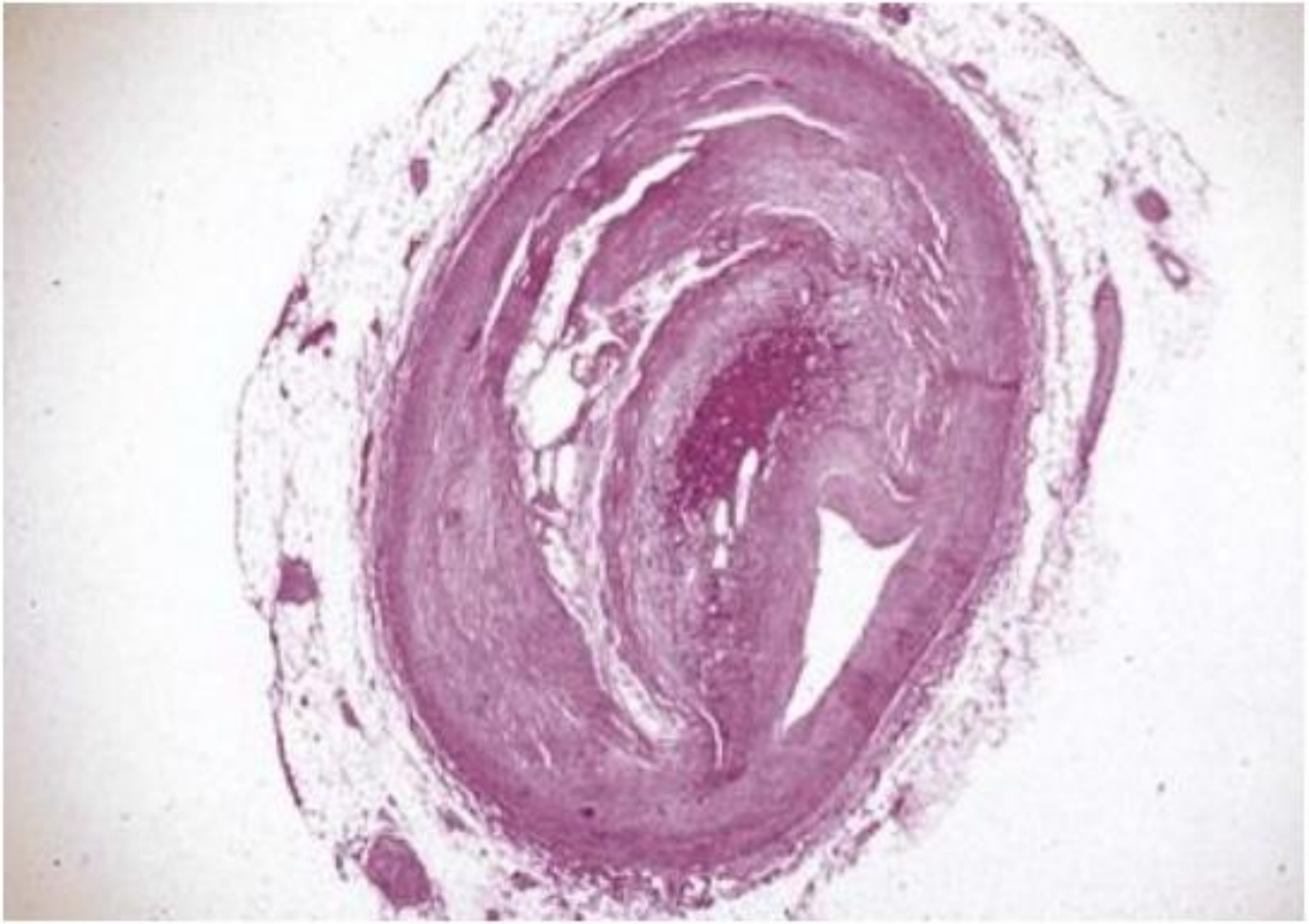
CARDIAC PARAMETERS

Cardiac output	The amount of blood ejected from the left ventricle/ minute, and normally it is equal to the venous return. The calculation is CO = stroke volume (SV) x heart rate (HR)
Stroke volume	The amount of blood pumped out of the heart after one contraction. It is the difference in end-diastolic (EDV) and end-systolic volume (ESV)
The preload	The tension on the ventricular wall muscle made by EDV. The larger EDV the larger the preload, the stretch it applies on the ventricular wall increases its contraction force within physiological limit
The afterload	The pressure in the large arteries at the end of diastole, this is the pressure that the contraction of the ventricular wall must exceed to push the blood into large arteries. diastolic blood pressure is one of the better ways to index afterload
The ejection fraction	Stroke volume/end diastolic volume. Normal ejection fraction is >55%

Diastolic pressure	The lowest pressure in an artery at the beginning of the cardiac cycle, while the ventricles are relaxing and filling. DP is directly proportional to total peripheral resistance (TPR)
Systolic pressure	The peak pressure in an artery at the end of the cardiac cycle, while the ventricles are contracting. Directly related to stroke volume, as stroke volume increases, SP also increases. SP is also affected by aortic compliance
Pulse pressure	The difference between SP and DP. Pulse pressure is proportional to SV and inversely proportional to arterial compliance.
Mean arterial pressure	The average pressure in the arteries throughout the cardiac cycle. The MAP is always closer to DP. MAP is calculated by MAP= DP + 1/3 (pulse pressure). Also, by MAP = CO x TPR, where CO is cardiac output.
Central venous pressure	The pressure in the center of the right atrium, its affected by the volume of venous return and reflected on the engorgement of neck veins

ATHEROSCLEROSIS


Endothelium
Intima
Media
Adventitia
1. Chronic endothelial "injury":
• Hyperlipidemia
• Hypertension
• Smoking
• Homocysteine
• Hemodynamic factors
• Toxins
• Viruses
• Immune reactions
Response to injury
2. Endothelial dysfunction (e.g., increased permeability, leukocyte adhesion) Monocyte adhesion and emigration
3. Smooth muscle emigration from media to intima; macrophage activation
Fatty streak
4. Macrophages and smooth muscle cells engulf lipid
Lymphocyte
Fibrofatty atheroma
5. Smooth muscle proliferation, collagen and other ECM deposition, extracellular lipid
Lymphocyte
Collagen
Lipid debris



Personal history

- It includes the patient's personal data
- Helps you get familiar with the patient
- You ask the patient about his/her name, age, marital status, number of offspring and the youngest of them, occupation and residence
- You also ask about special habit of medical importance eg, alcoholism and smoking
- You also ask about history of contact to canal water and history of travelling abroad

Smoking index

- **Smoking Index = (Cigarettes per day) x (Years of smoking)**
- Alternatively, a "pack-year" (a pack being 20 cigarettes) is often used for a cumulative measure: Pack-Years = (Number of packs per day) x (Years of smoking).
- **1-100:** Mild smoker.
- **101-299:** Moderate smoker.
- **300 or more:** Heavy smoker.

Personal history

- Each single item of the patient's personal history doesn't mean any thing in particular
- However, it leads your mind to certain problem specific for the gender, the age, the occupation or the residence of the patient

COMPLAINT

- “Can you tell me more about what brought you in today?”
- “How would you describe the problem you’re experiencing?”
- “When did you first notice this?”

- Written in patient own words
- The complaint of the present illness vs the present complaint of the illness
- If more than one arrange either chronologically or the most annoying
- Write the complaint and the duration between brackets

PRESENT HISTORY

- The complaint usually refers to certain system
- Begin by analysis of the complaint(s), review the other symptoms of the system then review of other systems

CARDIAC SYMPTOMS AND THEIR ANALYSIS

Chest pain

- Onset, course, duration
- Site of maximal intensity
- Radiation, and reference
- Character
- Mode of precipitation and mode of relief

Analysis of chest pain

- **Onset**
- “When did the pain start?”
- “Was it sudden or gradual?”
- “What were you doing when it started?”
- **Location**
- “Where exactly do you feel the pain?”
- “Can you point to it with one finger, or is it spread out?”
- **Character (Quality)**
- “Can you describe what the pain feels like — sharp, dull, burning, pressure, heaviness?”
- **Radiation**
- “Does the pain move anywhere, like to your arm, neck, jaw, back, or stomach?”
- **Associated symptoms**
- “Do you feel short of breath?”
- “Any sweating, nausea, or vomiting?”
- “Any palpitations, dizziness, or fainting?”
- “Any cough, fever, or sputum with blood?”

Analysis of chest pain

- **Timing & Duration**
- “How long does the pain last?”
- “Is it constant or does it come and go?”
- “Is there a particular time of day it happens?”
- **Exacerbating/Relieving factors**
- “What makes the pain worse — exertion, deep breathing, coughing, meals, lying down?”
- “What makes it better — rest, sitting forward, medications (like nitroglycerin or antacids)?”
- **Severity**
- “On a scale of 0–10, how bad is the pain?”
- **Past history & Risk factors**
- “Have you ever had this pain before?”
- “Do you have high blood pressure, diabetes, high cholesterol, or heart disease?”
- “Do you smoke or have a family history of heart problems?”

Angina pectoris

- Intermittent chest pain, stabbing in character
- Retrosternal referred to left shoulder, left arm, left side of neck
- Precipitated by excersion and relieved by rest and nitrates
- If the pain becomes continuous without relief acute myocardial infarction should be put in consideration

Dissecting aortic aneurysm

- **Onset**
- **Sudden, abrupt onset** (patients often remember the exact moment it started).
- **Character**
- Described as **severe, tearing, ripping, or stabbing** in nature.
- **Location**
- Typically **retrosternal** or **interscapular** (between the shoulder blades).
- Location may depend on site of dissection:
  - Ascending aorta → anterior chest pain.
  - Descending aorta → interscapular/back pain.
  - Abdominal aorta → abdominal pain.
- **Radiation**
- Can radiate to the back, abdomen, neck, or legs depending on extension.
- **Duration**
- Persistent and unrelenting (unlike angina, which lasts minutes).

Dissecting aortic aneurysm

- **Severity**
- Usually **very severe, maximal at onset** (distinguishing from myocardial infarction where pain builds up gradually).
- **Associated Features**
- Syncope, neurological deficits (if carotids involved).
- Hypertension or hypotension/shock (if rupture or tamponade).
- Asymmetrical pulses or blood pressures.
- New diastolic murmur (aortic regurgitation).

Pleuritic and pericarditis pain

- Pain due to inflammation of pleura and pericardium is sharp stitching will localized pain increase with movement or respiration
- Either central in pericarditis or intercostal in pleurisy

Da costa syndrome cardiac anxiety

- Sharply localized infra mammary stitching pain

Palpitation

- Onset, course, duration
- Rate (rapid or slow)
- Rhythm (regular or irregular)
- Mode of precipitation and relief

Types as desriped by the patient

- **Rapid/fast heartbeat** → “My heart is racing” (tachycardia).
- **Slow heartbeat** → “It feels like my heart is too slow” (bradycardia, less common as a complaint).
- **Irregular heartbeat** → “My heart skips beats” or “beats come at random” (atrial fibrillation, ectopics).
- **Thumping or pounding** → Strong forceful beats, sometimes after a pause (commonly felt with premature beats).
- **Fluttering** → Rapid, light, butterfly-like sensation in the chest (often supraventricular arrhythmias).
- **Pause or missed beat** → Feeling like the heart stops then starts again (ectopic beats).

- **Exertional palpitations** → worsen with activity (may suggest arrhythmia, ischemia, or structural disease).
- **Resting or nocturnal palpitations** → may suggest anxiety, thyrotoxicosis, or ectopics.
- **Postural palpitations** → occur when standing up (e.g., postural orthostatic tachycardia syndrome, POTS)

SYMPTOMS OF PULMONARY CONGESTION

Dyspnea

- Difficult or subjective sense of breathing
- Onset, course , duration
- Mode of precipitation and relief
- Relation to time and posture

Positional dyspnea

- **Orthopnea**
  - Dyspnea when lying flat, relieved by sitting/standing.
  - Seen in **left-sided heart failure**, severe lung disease, obesity.
- **Paroxysmal Nocturnal Dyspnea (PND)**
  - Sudden dyspnea that awakens the patient from sleep, usually after 1–3 hours of lying down.
  - Relieved by sitting upright.
  - Seen in **congestive heart failure**.
- **Trepopnea**
  - Dyspnea when lying on one side but not the other.
  - Often due to **unilateral lung disease**, **large pleural effusion**, or **heart disease** (e.g., left atrial myxoma).
- **Platypnea**
  - Dyspnea that worsens when sitting or standing, relieved by lying down.
  - Associated with **hepatopulmonary syndrome**, intracardiac shunts (e.g., patent foramen ovale), or pulmonary arteriovenous malformations.

Paroxysmal nocturnal dyspnea

- It is the *sudden awakening at night with a sensation of severe shortness of breath*, usually occurring **1–3 hours after sleep**, that makes the patient sit upright or stand to get relief.
- Caused by redistribution of fluid from the lower limbs to the lungs during recumbency, leading to pulmonary congestion.
- Classically associated with **left-sided heart failure**.
- Patients often report needing to open a window, sit upright, or sleep propped up with pillows to breathe comfortably.

Cough and expectoration

- Onset course of duration
- Mode of precipitation and relief
- Sputum amount and colour and presence of blood

Cardiac vs bronchial asthma

- Occur in right sided heart failure
- Age: older
- At night two hours after falling asleep
- Crepitation and coughing of profuse frothy sputum

- In airway narrowing in bronchial asthma
- Age: younger
- By dawn
- Wheezing and coughing of scanty vicid sputum

Hemoptysis

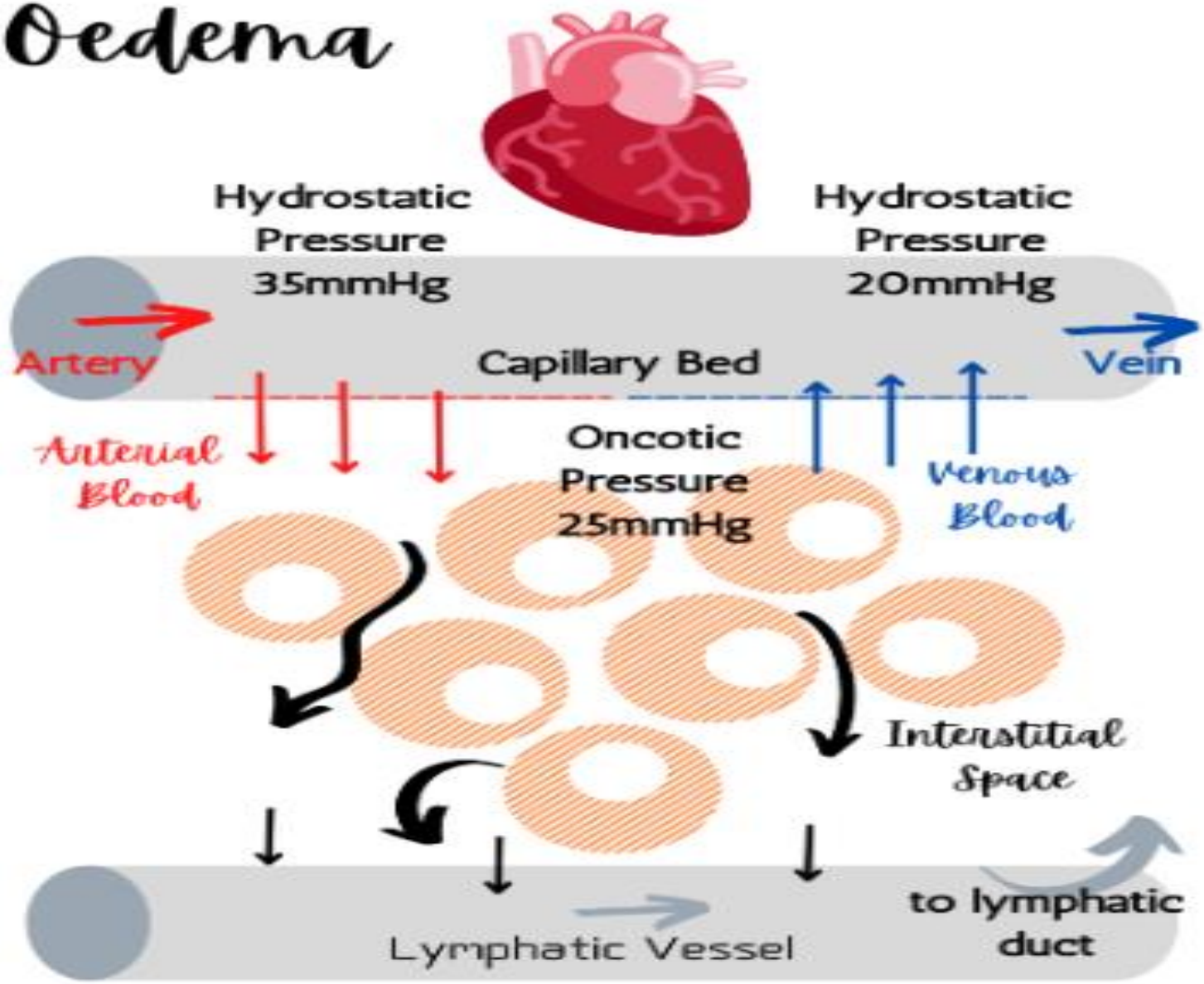
- **Blood-streaked sputum** → pulmonary congestion (mitral stenosis, LVF).
- **Pink frothy sputum** → acute pulmonary edema.
- **Profuse/massive hemoptysis** → pulmonary apoplexy (ruptured bronchial veins in severe mitral stenosis).
- **Hemoptysis with pleuritic pain** → pulmonary embolism/infarction.

SYMPTOMS OF SYSTEMIC CONGESTION

Lower limb edema/ ascites

- Heart failure results in salt and water retention due to renal underperfusion and consequent activation of the renin–angiotensin– aldosterone system. This leads to dependent pitting edema.

Oedema


Hydrostatic Pressure 35mmHg
Hydrostatic Pressure 20mmHg
Artery
Capillary Bed
Vein
Arterial Blood
Oncotic Pressure 25mmHg
Venous Blood
Interstitial Space
Lymphatic Vessel
to lymphatic duct

Analysis of lower limb edema

- **Onset & Duration**
- “When did you first notice swelling in your legs?”
- “Did it start suddenly or gradually?”
- **Progression**
- “Has the swelling been getting worse over time?”
- “Does it spread upwards (from feet to ankles, then legs)?”
- **Laterality & Distribution**
- “Is the swelling in both legs or just one?”
- “Does it involve the feet, ankles, or extend up to the thighs?”

Analysis of lower limb edema

- **Timing & Variation**
  - “Is the swelling worse at the end of the day or after standing for long?”
  - “Does it improve with rest or elevation of the legs?”
- **Associated symptoms**
  - “Do you have shortness of breath or orthopnea?” (→ suggests cardiac cause)
  - “Any abdominal swelling, jaundice, or loss of appetite?” (→ liver disease)
  - “Any decrease in urination or foamy urine?” (→ kidney disease)
  - “Any pain, redness, or warmth in one leg?” (→ DVT)

Cardiac ascites

- **Cardiac ascites** = accumulation of fluid in the peritoneal cavity due to **right-sided or biventricular heart failure**.
- Ascites precox: It means **ascites appears before hepatomegaly, splenomegaly, or marked edema**. Seen in
- Chronic right-sided heart failure (e.g., from pulmonary hypertension, tricuspid stenosis/regurgitation).
- Constrictive pericarditis.
- Restrictive cardiomyopathy.

Analysis of ascites

- **Onset & Duration**
- “When did you first notice your abdomen becoming swollen?”
- “Was it gradual or sudden?”
- **Progression**
- “Has it been increasing steadily?”
- “Do you feel more bloated after meals or all the time?”
- **Associated Symptoms**
- “Do you feel short of breath when lying down?” (→ diaphragmatic pressure from fluid)
- “Any ankle or leg swelling with it?”
- “Any yellowing of the eyes or skin?” (→ liver disease)
- “Any history of heart problems or difficulty breathing?” (→ cardiac ascites)
- “Any change in urine amount or frequency?” (→ renal cause)
- **Past Medical History**
- “Do you have a history of liver disease, heart failure, kidney disease, or tuberculosis?”
- “Have you ever had a similar swelling before?”

Right hypochondrial tenderness/ pain

- Right heart failure → ↑ right atrial pressure → ↑ systemic venous pressure → **congestive hepatomegaly**.
- The stretched liver capsule (Glisson's capsule) causes **dull, aching pain or discomfort in the right hypochondrium**.
- If congestion is severe, it can lead to **tender hepatomegaly** and sometimes jaundice (congestive hepatopathy).

Clinical features

- **Dull aching pain** in the right upper abdomen.
- **Worsens with exertion** or when venous congestion increases.
- Associated with:
- Tender, enlarged liver.
- Ascites (in advanced cases).
- Peripheral edema, raised JVP (signs of systemic venous congestion).

GI Symptoms

- Anorexia, early satiety, nausea, abdominal discomfort → due to visceral congestion

LOW CARDIAC OUTPUT MANIFESTATIONS

- **General Symptoms**
- **Fatigue, weakness, easy fatigability** → reduced muscle perfusion.
- **Cold extremities** → poor peripheral circulation.
- **Dizziness, lightheadedness, syncope** → reduced cerebral perfusion.
- **Neurological Symptoms**
- Confusion, poor concentration, memory problems (especially in elderly).
- Syncope or near-syncope (especially in severe aortic stenosis, arrhythmias).
- **Renal Symptoms**
- Oliguria (reduced urine output).
- Nocturia (in mild cases, due to improved renal perfusion when supine).

- **Other Clinical Features**
- Exercise intolerance.
- Pallor, sweating, tachycardia (compensatory sympathetic activation).
- Low blood pressure, narrow pulse pressure.

Intermittent claudication

- It is **exercise-induced pain, cramp, or tightness** in a muscle group (usually calf, sometimes thigh or buttock) caused by **inadequate arterial blood supply**.
- The pain is **relieved by rest** within minutes.

Syncope

- • ***Postural*** **(*orthostatic*)** ***hypotension*** is a drop in systolic blood pressure of 20mmHg or more on standing from a sitting or lying position.
- Usually, reflex vasoconstriction prevents a drop in pressure, but if this is absent or the patient is fluid-depleted or on vasodilating or diuretic drugs, hypotension occurs.

Syncope

- Syncope
- Syncope is a transient loss of consciousness due to inadequate cerebral blood flow. The cardiovascular causes are listed in
- • ***A vasovagal attack*** is a simple faint and is the most common
- cause of syncope.
- The mechanism begins with peripheral vasodilation and venous pooling of blood, leading to a reduction in the amount of blood returned to the heart. The near-empty heart responds by contracting vigorously, which, in turn, stimulates mechanoreceptors (stretch receptors) in the inferoposterior wall of the left ventricle.
- These, in turn, trigger reflexes via the central nervous system, which act to reduce ventricular stretch (i.e. further vasodilation and sometimes profound bradycardia), but this causes a drop in blood pressure and therefore syncope. These episodes are usually associated with a prodrome of dizziness, nausea, sweating, tinnitus, yawning and a sinking feeling. Recovery occurs within a few seconds, especially if the patient lies down.

TO FINISH THE SHEET

Other system review

- **Respiratory System**
- (to detect pulmonary congestion, pulmonary embolism, COPD, etc.)
- “Do you have cough or sputum?”
- “Any blood in the sputum (hemoptysis)?”
- “Do you wheeze or have frequent chest infections?”
- “Any shortness of breath on exertion, lying down, or at night?”
- **2. Gastrointestinal System**
- (heart disease can cause hepatic congestion, ascites, or be linked to GI disease)
- “Any abdominal swelling or fullness?” (ascites)
- “Any swelling or pain in the right side under the ribs?” (hepatic congestion)
- “Have you noticed yellowing of the eyes/skin?” (jaundice in right HF)
- “Any nausea, vomiting, loss of appetite, or early satiety?”
- “Any black stools or vomiting blood?” (anticoagulant complications)

Other system review

- **3. Genitourinary System**
- (to detect renal hypoperfusion or complications from cardiac drugs)
- “Any change in urine amount — less than usual or passing more at night?” (oliguria, nocturia)
- “Any swelling of the body?” (fluid retention)
- “Any frothy urine?” (proteinuria suggesting renal disease)
- **4. Nervous System**
- (to detect embolic events, syncope, hypoperfusion)
- “Any fainting or blackouts?” (arrhythmia, low cardiac output)
- “Any weakness, numbness, or difficulty speaking?” (stroke/TIA from emboli in AF, valve disease)
- “Any headache or dizziness?”

- **5. Musculoskeletal System**
- “Any joint pains?” (rheumatic fever history, infective endocarditis with arthralgia)
- “Any swelling/redness in the legs?” (DVT, edema)
- **6. General/Systemic**
- “Any fever, chills, or night sweats?” (infective endocarditis)
- “Any significant weight gain (fluid retention) or weight loss (chronic illness, heart failure)?”
- “Any fatigue or reduced exercise tolerance?”

PAST HISTORY

Past cardiac illness history

- **Previous Cardiac Illnesses**
- “Have you ever been told you have a heart problem before?”
- History of **rheumatic fever** or rheumatic heart disease.
- Previous **myocardial infarction, angina, heart failure**.
- **Arrhythmias** (atrial fibrillation, palpitations, syncope).
- **Congenital heart disease** or corrective surgery.
- **Valvular disease** or valve replacement.
- **Hypertension** (duration, control).
- **Hyperlipidemia**.

Past cardiac illness history

- **2. Other Medical Illnesses**
- **Diabetes mellitus** (major risk factor for ischemic heart disease).
- **Renal disease** (causes hypertension, fluid overload).
- **Chronic lung disease** (can cause cor pulmonale).
- **Thyroid disease** (thyrotoxicosis → arrhythmias, hypothyroidism → bradycardia).

Past cardiac illness history

- **3. Previous Hospitalizations / Interventions**
- “Have you ever been admitted for chest pain, heart failure, or high blood pressure?”
- “Have you had any cardiac procedures like angioplasty, bypass surgery, pacemaker, valve surgery?”
- **4. Infective / Inflammatory History**
- History of **tuberculosis** (can cause constrictive pericarditis).
- History of **endocarditis**.
- **Syphilis** (rare now, but can cause aortitis).

Past cardiac illness history

- **5. Medications**
- “Are you on any regular medications?” (antihypertensives, anticoagulants, antianginals, diuretics, digoxin).
- Past use of drugs with **cardiac side effects** (e.g., chemotherapy, steroids, NSAIDs).
- **6. Allergies & Surgeries**
- Drug allergies (important before giving contrast, antibiotics, etc.).
- Previous surgeries (cardiac or non-cardiac).

FAMILY HISTORY

Family history of cardiac illness

- **premature Ischemic Heart Disease**
- "Has anyone in your family had a heart attack or angina at a young age?"
  - Premature CAD = **men <55 years, women <65 years**.
- **Sudden Cardiac Death**
- "Any history of sudden, unexplained death in the family?"
  - Suggests inherited arrhythmias (e.g., Long QT syndrome, Brugada syndrome) or hypertrophic cardiomyopathy.
- **Hypertension, Diabetes, Hyperlipidemia**
- "Does anyone in your family have high blood pressure, diabetes, or high cholesterol?"
  - Important cardiovascular risk factors.

Family history of cardiac illness

- **Congenital Heart Disease**
- "Any family members born with heart problems or who had surgery for a heart defect?"
- **Valvular or Rheumatic Heart Disease**
- Rarely familial, but may appear in regions with high prevalence of rheumatic fever.
- **Cardiomyopathies**
- "Any family history of heart muscle disease, heart transplant, or unexplained heart failure?"
  - Dilated, hypertrophic, or restrictive cardiomyopathy can be inherited.
- **Aortic Disease**
- "Any history of aortic aneurysm or dissection in the family?"
  - Seen in Marfan syndrome, Ehlers–Danlos, bicuspid aortic valve

OBSTETRIC AND MENSTRUAL HISTORY

Menstrual History

- **Age at menarche & menopause** → Early menopause is linked with ↑ cardiovascular risk.
- **Cycle regularity & amount of bleeding** →
  - Heavy menstrual bleeding may cause **iron-deficiency anemia**, worsening angina or heart failure.
  - Amenorrhea/oligomenorrhea may suggest **endocrine issues** (thyroid, PCOS) that impact the heart.
- **Menopausal status** →
  - Post-menopausal women lose the protective effect of estrogen → ↑ ischemic heart disease.
  - Ask about hormone replacement therapy (HRT).

THANK YOU

Obstetric History

- **Gravida and para** (number of pregnancies, deliveries, abortions).
- **Complications of pregnancy**:
  - **Pre-eclampsia / eclampsia** → Strongly associated with later **hypertension and ischemic heart disease**.
  - **Gestational diabetes** → Risk of future diabetes & coronary artery disease.
  - **Peripartum cardiomyopathy** → May present during late pregnancy or early postpartum.
- **Mode of delivery** → Caesarean section, operative deliveries (important for anticoagulated patients).
- **History of excessive bleeding** → Relevant in patients on anticoagulants or with prosthetic valves.
- **Contraceptive use** → Oral contraceptives ↑ risk of **thrombosis, hypertension, myocardial infarction, stroke**.