**Cardiovascular System**

**Main Function**: to pump bloody through the body, thereby helping to

1. Supply tissues with vital nutrients
2. Facilitate excretion of waste products

**Functional components and their functions**

|  |  |
| --- | --- |
| Myocardium | Engine (pump) |
| Valves (part of endocardium) | Maintain unidirectional blood flow (channels blood in correct direction) |
| Conduction system | Maintain coordinated pumping rhythm. |
| Blood supply | Provides sufficient nutrients to heart – Coronary arteries (3 main: left anterior descending artery, left circumflex arteries, right coronary artery) |

**Heart Failure**

Heart failure is a multifactorial disease that is often the end point of many heart diseases.

**Definition:** Clinical condition where the heart is unable to meet the body’s demands (despite compensatory mechanisms), although the venous filling pressure is normal or raised.

**Congestive heart failure**

Heart failure involving both right and left ventricles. Left ventricle failure: fluid accumulates in the lungs. Right ventricle failure: fluid accumulates in the legs, abdominal cavity.

Reduced flow of arterial blood from the heart can lead to peripheral circulatory failure (cardiogenic shock)

Main causes of heart failure:

- Pump failure – ischaemic heart disease, cardiomyopathy etc

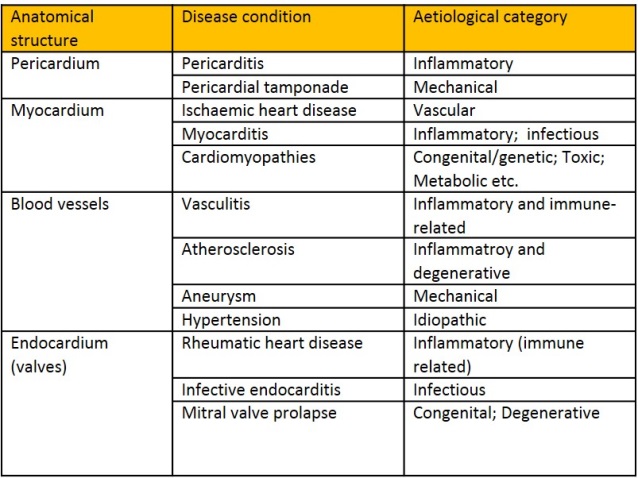
- Abnormal flow – pressure overload eg. systemic hypertension, aortic stenosis); volume overload (eg. valvular regurgitation)

- Abnormal conduction system (eg. atrial fibrillation)

**Aetiologic classification of Cardiovascular Disease:**

* **V**ascular – eg. Coronary atherosclerosis and ischaemic heart disease
* **I**nflammatory/infectious – eg. infective endocarditis; rheumatic heart disease; viral myocarditis
* **T**raumatic/Mechanical or Toxic – eg. cardiac tamponade ; coarctation of the aorta
* **A**utoimmune
* **M**etabolic -  infiltrative or storage diseases
* **I**atrogenic or Idiopathic – eg. drug induced cardiotoxicity
* **N**eoplastic – eg. atrial myxoma
* **C**ongenital – eg. congenital cardiac structural abnormalities – ventricular and atrial septal defects; tetralogy of Fallot etc.
* **D**egenerative – eg. calcific aortic stenosis

**Anatomical classification of cardiovascular disease:**

Some diseases feature more commonly within each anatomical subsite.

(This is not a fully comprehensive list)

**Clinical Manifestations**

(Refer to clinical text e.g. Tally and O’Connor for more details)

**Localized symptoms directly from cardiac pathology:**

* Chest pain (nature of which is clinically important).
  + E.g. ischemia, pericarditis
* Palpitations (e.g. in arrhythmias)

**Signs/symptoms arising in other organs**

* Renal induced water retention; renal impairment or failure
* Brain: cerebrovascular accident (infarct, haemorrhagic stroke – seen in poorly controlled hypertension or thromboembolism from atheromatous changes in carotid artery branches); hypertensive encephalopathy.
* Lower limbs: peripheral vascular disease (This is seen in patients with atheromatous changes and thromboembolic complications in the vessels supplying the lower limbs)

**Systemic signs/symptoms**

* Eg. Heart failure
* Systemic venous congestion – body cavity effusions, lower limb swelling, etc.
* Symptoms arising from pulmonary congestion and oedema (in left heart failure) – dyspnoea and some specific types of dyspnoea, cough. (read up on these)
* Fatigue, dizziness, cool extremities
* Collapse from cardiogenic shock (eg. acute myocardial infarction, sudden cardiac death etc)
* Cyanosis
* High fever (infection) – e.g infective endocarditis

**Symptoms of aortic disease (thoracic, abdominal)**

* Severe pain radiating to back, shock, rapid mortality. E.g. aortic dissection or rupture of aneurysm

**Mindmaps:**

**1. Main CVS diseases overview -** Function and classification

2. Atherosclerosis and ischemic heart disease

3. Hypertension and heart failure

<http://blog.nus.edu.sg/pathotest2/cardiovascular-system/iv-big-picture-main-cardiovascular-diseases/>

**Talking POTS and slides**

<http://blog.nus.edu.sg/pathotest2/cardiovascular-system/cvs-talking-pots-and-slides/>

**Quiz**

<http://blog.nus.edu.sg/pathotest2/cardiovascular-system/cvs-quiz/>