

Diseases of Heart

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Categories of Heart Diseases

- Ischemic heart disease
- Hypertensive heart disease
- Congenital Heart disease
- Valvular heart diseases
 - Calcific aortic valve stenosis
 - Mitral valve prolapsed
 - Infective endocarditis
 - Rheumatic heart diseases

Ischemic Heart Diseases

- Def: A group of closely related diseases of heart result from imbalance between supply and demand of heart for oxygenated blood.
- Types
 - Angina pectoris
 - Myocardial infarction
 - Chronic ischemic heart disease
 - Sudden cardiac death

Causes of Diminished Oxygen in Myocardium

- Increased demand: in increased heart rate
- Diminished oxygen transport in blood
 - Congenital cyanotic heart disease
 - Severe anaemia
 - Carbon monoxide poisoning
 - Lung disease
 - Smoking
- Reduction in coronary blood flow
 - Coronary atherosclerosis
 - Coronary thrombosis

Angina Pectoris

- Def: A type of ischemic heart disease characterized by paroxysmal attack of substernal or precordial discomfort.
- Nature of pain
 - Constricting
 - Squeezing
 - Choking
 - Stabing

- Types
 - Stable angina
 - Discomfort or pain following
 - Physical exertion or
 - Emotional excitement
 - Causes: Coronary artery narrowing following atherosclerosis
 - ECG: ST segment depression
 - Prinz-metal angina
 - Cause: Coronary arterial spasm
 - ECG: ST segment not depressed
 - Unstable angina
 - Discomfort or pain following less effort or at rest
 - Frequent attack with prolonged duration
 - May follow myocardial infarction
 - Cause: Coronary artery narrowing following atherosclerosis or coronary spasm
 - ECG: ST segment depressed

Myocardial Infarction

- Types
 - Transmural: involvement of full or almost full thickness of ventricular wall.
 - Subendocardial: Involvement of inner one-third of ventricular wall.
 - Pathogenesis
 - Occlusion of coronary artery leads to MI.

Causes of Occlusion

- Severe coronary atherosclerosis
- Formation of thrombus following
 - Fissuring
 - Ulceration on atheroma
- Superimposed thrombus on atheroma
- Vasospasm
- Platelets aggregation and thrombus

Morphology of MI

- Virtually all infarcts involve the left ventricle including intraventricular septum
 - Within 4-12 hours: beginning of coagulation necrosis and neutrophilic infiltration
 - Within 18-24 hours: continuing coagulation necrosis and marginal contraction with pale coloration.
 - Within 24-72 hours: Coagulative necrosis is completed.
 - Within 3-7 days: beginning of disintrigation by macrophages with onset of fibrovascular response. Hyperemic border with central yellow brown softening.
 - Within 10 days: Red brown area with vascularized margin.
 - Within 7th week: Scarring completed.

Laboratory Diagnosis of MI

- Cardiac troponin I Elevated: a protein present in cardiac muscle
 - Neutrophilic leucocytosis
 - Enzyme estimation
 - Creatinine kinase MB (CK-MB)
 - Elevated above base line within 4-8 hours of infarction, peak level at 24 hours and falls to baseline within 4 days.
 - AST (SGOT) elevated
 - LDH elevated about 24 hours after infarction, peak level in 3 to 6 days and falls to baseline after 2 weeks.
- *CK-MB is important for recent MI and LDH for old MI.

Complication of MI

- Cardiac arrhythmia
- Left ventricular failure with pulmonary edema
- Cardiogenic shock
- Rupture cordae tendeneae
- Rupture papillary muscle
- Rupture septum
- Mural thrombus formation in heart chamber
- Pericarditis

Rheumatic Fever with Rheumatic Heart Diseases

- Def: Rheumatic fever is an acute, recurrent, inflammatory disease, principally of children, that follows a pharyngeal infection with group A Streptococci.
- Characterized by:
 - Fever
 - Migratory polyarthrititis
 - Carditis
 - Subcutaneous nodule
 - Erythema marginatum of skin
 - Sydenham's chorea

Rheumatic Carditis

Pathogenesis

Cross reaction:

- Glycoprotein in heart valves are structurally similar with streptococcal antigen. Antibodies against streptococcus cross react with the glycoproteins.
- Antigen-antibody complex form in heart valve activates complement system by classical pathway.
- Products of complement system causes carditis

Autoimmunity

- Streptococcal infection activates autoimmune reaction
- Anti heart antibodies formed that evokes carditis

- Morphology of rheumatic carditis
- Heart valve
 - Aschoff's bodies in pericardium, myocardium and endocardium.
 - Central fibrinoid necrosis surrounded by lymphocytes, plump histiocytes (Aschoff's cells) and plasma cells.

Infective Endocarditis

- Most serious infection, characterized by colonization or invasion of endocardium or heart valve by microbiologic agent leading formation of organism laden friable vegetations, called infective vegetations.
- Types
 - Acute
 - Subacute

Predisposing Factors

- Cardiac abnormalities
 - Rheumatic heart disease
 - Congenital heart disease
- Causative agents
 - Common
 - Streptococcus viridans
 - Streptococcus fecalis
 - Less Common
 - Staphylococcus aureus

- Complication
 - Cardiac complication
 - Valvular stenosis
 - Suppurative pericarditis
 - Embolic complication
 - Metastatic infection
 - Renal complication
 - glomerulonephritis

Thanks