* Pathology of Endocarditis
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* **Endocarditis** includes: 1- Infective endocarditis (IE)

2- nonbacterial thrombotic endocarditis

3- Libman - Sacks endocarditis:

***I- Infective endocarditis:***

- is a serous infection requiring early diagnosis and intervention

- is characterized by: 1- microbial invasion of endocardium (valves)

2- destruction of underlying cardiac tissues

3- formation of bulky friable bacterial vegetations (microorganisms, fibrin, platelets and inflammatory cells)

- is caused by: 1- bacteria (majority of cases)

2- fungi

- is classified into:

1- Acute: - infection by highly virulent organisms (S. aureus, beta hemolytic streptococci, pneumococci)

- occurs in previously normal heart

- causes death in more than 50% of patients despite therapy

- rapidly developing fever with rigors, malaise

- embolic complication is common

2- Subacute: - infection by low virulent organisms (St. viridans, enterococci)

- occurs in previously abnormal heart

- most patients recovering after therapy

- malaise, low grade fever, flu-like symptoms

- embolic complication less common

* **Pathogenesis:**

- blood-borne bacteria reach the valvular endocardium, from:

a) infections elsewhere in the body

b) intravenous drug abuse

c) dental or surgical procedures

- damage to endocardium, exposure of subendothelium connective tissue to blood, formation of (sterile) small thrombi

- Bacterial invasion of thrombi and bacterial vegetations formation

- The vegetations may: 1- erode into underlying myocardium (ring abscess)

2- detach and impact distant sites (septic emboli = septic infarct)

- neutropenia, immunodeficiency, malignancy, immunosuppression therapy, DM, prosthetic valves, cardiac catheter increase the risk of IE

* **Morphology:**

- friable bulky vegetations are present on valves (single or multiple)

- mitral and aortic valves are most commonly involved

- tricuspid valve involved commonly in intravenous drug abuse

* **Clinical features:**

- fever

- vegetations can embolize producing abscess and infarctions in distant sites (e.g. embolic stroke, splenic and kidney infarcts etc.)

- valve destruction leads to regurgitation murmurs and CHF.

- extension of infection into heart ( abscess)

- immune complex vasculitis:

1- Roth’s spot (hemorrhages) in retina

2- Splinter hemorrhages in nail beds

3- Osler’s node (painful) on hands and feet

4- Janeway lesions in hand and feet (painless)

5- Glomerulonephritis

* - valve destruction  
  - immune complex vasculitis: Roth’s spot, Splinter hemorrhage, Osler’s node, Janeway lesion
* **Investigations:**

1- blood culture

2- CBC (leucocytosis, increased ESR)

3- echocardiography

* **Diagnosis:**- confirmed by Duke criteria (2 major, 1 major + 3 minors or 5 minors are required for diagnosis)

**Duke criteria:**

Major: 1- positive blood culture

2- echocardiography findings (vegetations, abscess)

3- new valvular regurgitation

Minor: 1- predisposing heart lesion

2- intravenous drug abuse

3- vascular lesions (hemorrhage, emboli)

4- immunological phenomena (glomerulonephritis

5- blood culture (showing uncharacteristic organisms

6- echo findings (not diagnostic of endocarditis

* **Complications:**

1- valve regurgitation

2- myocardial ring abscess or perforation

3- myocarditis

4- congestive heart failure

5- arrhythmias

6- septicemia

7- glomerulonephritis and so renal failure

8- systemic embolization with development of septic infarct

***II- Nonbacterial thrombotic endocarditis:***

- is characterized by deposition of thrombi

(fibrin, platelets, other blood components)

on valves

- occurs in previously normal valves

- no microorganisms (sterile vegetations)

- not lead to valve damage

- can embolize

* Pathogenesis:

- predisposed by: - hypercoagulable states:

1- sepsis with DIC

2- hyperestrogenic state

3- underlying malignancy (mucinous adenocarcinoma)

- endocardial trauma ( catheters)

- the diagnosis based largely on: 1- predisposing conditions 2- embolic stroke

***III- Libman -Sacks endocarditis:***

- occurs in SLE due to immune complex deposition

- involves mitral valve

- embolization is uncommon