

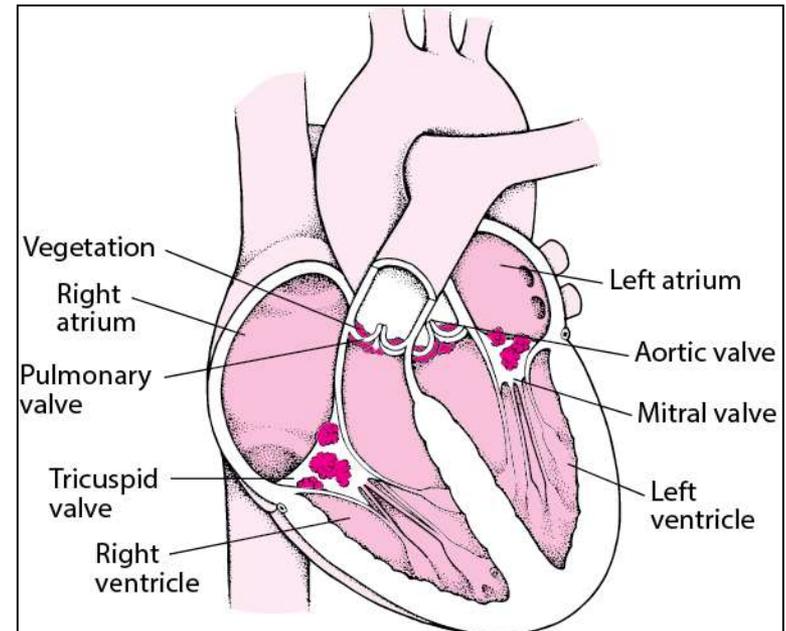


Infective Endocarditis

By
Professor Dina Abou Rayia

Infective endocarditis

- **Definition:** Microbial infection of the inner surface of the heart (endocardium) which is also called the endothelial surface
- It includes:
 - Valves
 - Chordae tendineae
 - Septa of the heart
 - Mural endothelium
- **NVE:** native valve endocarditis
- **PVE:** prosthetic valve endocarditis



Risk factors

- **Valvular heart disease that includes:**
 - Rheumatic heart disease
 - Congenital heart disease
- **Artificial valve**
- **Electronic pacemaker**
- **Haemodialysis**
- **Intravenous drug use: e.g addicts**
- **Immune suppression**

Commonly involved bacteria: *Streptococci* and *Staphylococci*

Incidence: 2-5 / 100,000 patient-years,

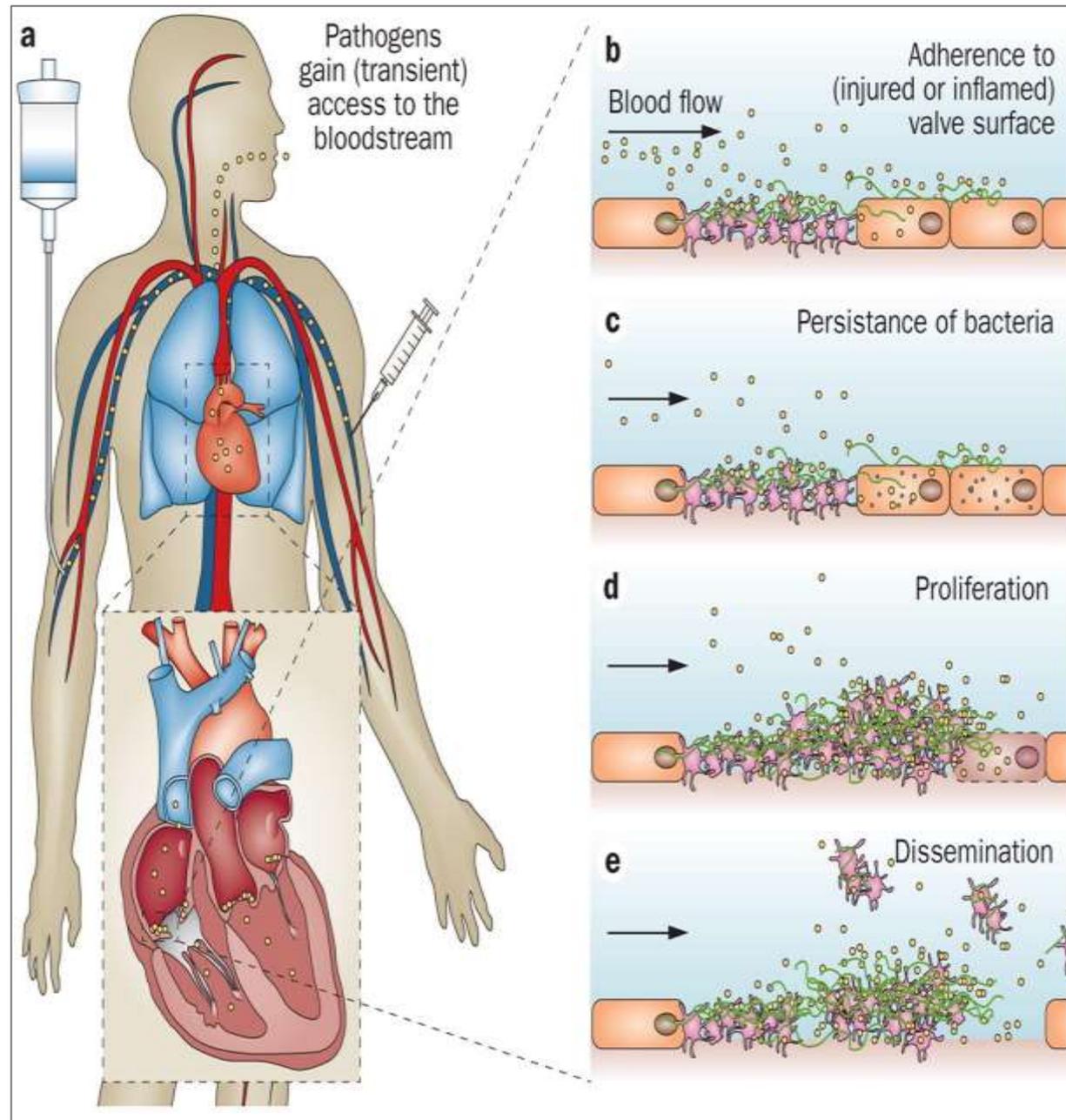
15—30 / 100,000 patient-years (>60 y/o)

Pathogenesis

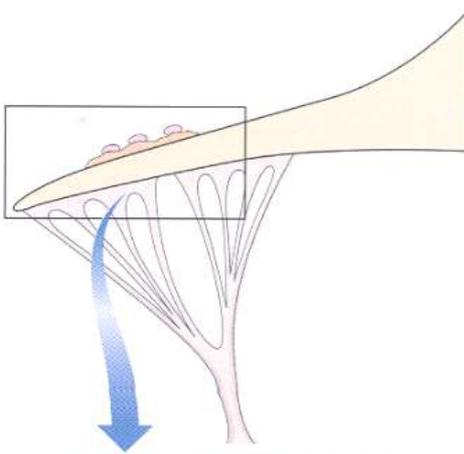
Growth of vegetation by platelet-fibrin deposition yields a sanctuary for bacteria.

The vegetation

- Variable in size
- Amorphous mass of fibrin & platelets
- Abundant organisms
- Few inflammatory cells



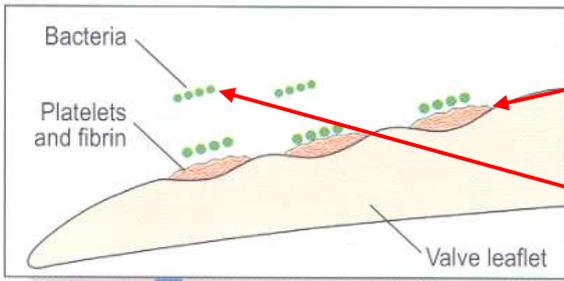
A



Turbulent blood flow traumatises endothelium



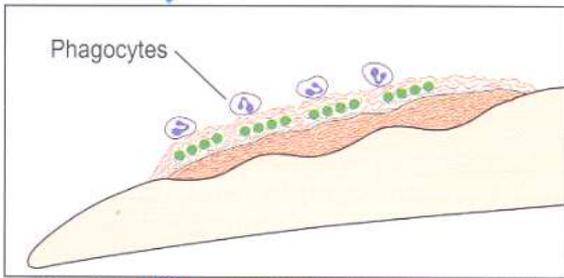
B



Nonbacterial thrombotic endocarditis

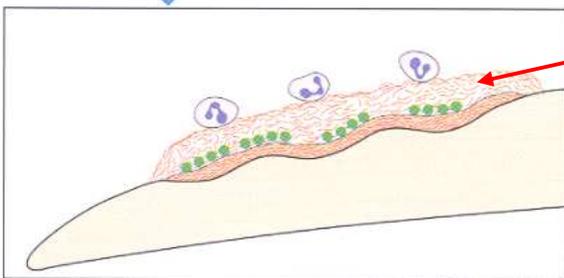
Bacteraemia

C



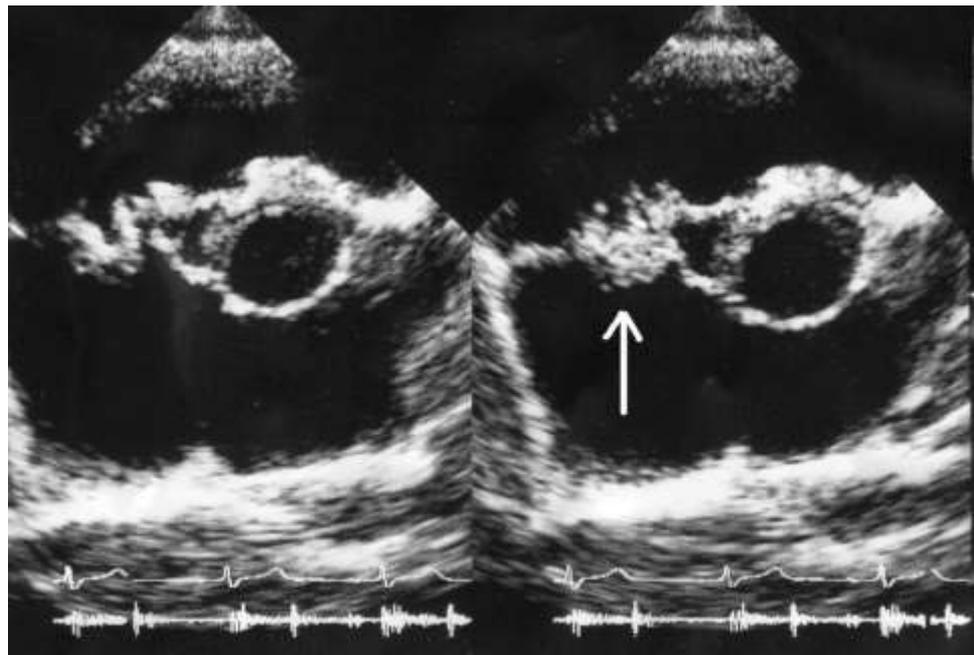
Further deposition of fibrin and platelets

D



Infective endocarditis

- Occurs on
 - Defective valves
 - Prosthetic valves
 - Normal valves
 - Congenital heart defects e.g.
 - Ventricular septal defect
 - Patent ductus arteriosus
- 40% with IE have
 - Normal heart
 - Undiagnosed defect



Classification of infective endocarditis

- **Classification based on the duration of symptoms:**
 - Acute: up to 6 weeks
 - Subacute: > 6 weeks and < 3 months
 - Chronic: > 3 months
- **Classification according to the incubation period:**
 - Endocarditis with short incubation: < 6 weeks
 - Endocarditis with long incubation: : > 6 weeks
- **Classification based on the heart side affected:**
 - Left-sided endocarditis (more common)
 - Right-sided endocarditis (5-10% of cases)

Infective Endocarditis

• Acute

- Toxic presentation
- Presentation developing in days to weeks
- Progressive valve destruction & metastatic infection
- Most commonly caused by *Staph. aureus*

• Subacute

- Mild toxicity
- Presentation over weeks to months
- Rarely leads to metastatic infection
- Most commonly caused by *viridans streptococci* and to a lesser extent by *enterococcus*

Infective Endocarditis

- **Intravenous Drug Abuse**
 - Risk is 2 – 5% per pt./year
 - Tendency to involve right-sided valves
 - Distribution in clinical series
 - 46 – 78% tricuspid
 - 24 – 32% mitral
 - 8 – 19% aortic
 - *Staph. aureus* predominant organism

Infective Endocarditis

- **Prosthetic Valve Endocarditis (PVE)**

- 10 – 30% of all cases in developed nations
- Early PVE – within 60 days
 - Nosocomial (*Staph. epidermidis* predominates)
- Late PVE – after 60 days
 - Community (same organisms as NVE)

Infective endocarditis

- **Nosocomial**
- Infected intracardiac device and catheter
- GI or GU tract surgery or instrumentation
- High mortality (40—56%)
- (*Staph. aureus* and Enterococcus)
- *S. aureus* catheter related bacteremia (23%)

Infective endocarditis-causing microorganisms

• Viridans streptococci:

- 35 — 65% NVE
- Normal inhabitants of the oropharynx, GIT and female genital tract
- Gram-positive cocci arranged in chains are typically alpha haemolytic but some strains are non-haemolytic on blood agar
- **Penicillin-sensitive**



Infective endocarditis-causing microorganisms

- *Streptococcus pneumoniae*:

- Alcoholism
- Aortic valve
- Concurrent pneumonia or meningitis

- Enterococcus:

- Normal GI tract flora and cause GU infection
- 5—15% NVE and PVE

Infective endocarditis-causing microorganisms

- *Staphylococcus*:

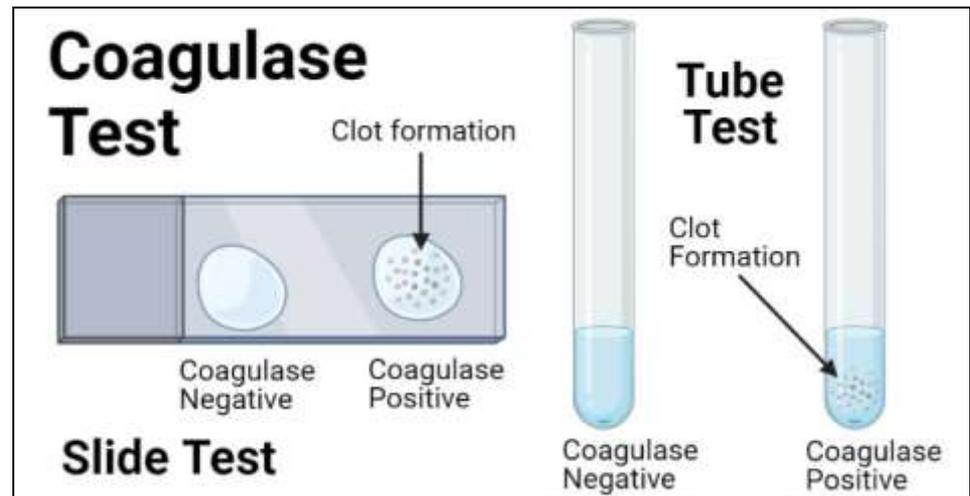
Coagulase-positive: *S. aureus*

Highly toxic febrile

30—50% CNS involvement

Coagulase-negative: *S. epidermidis*

Major cause of PVE



Infective endocarditis-causing microorganisms

- *Gram negative organisms*

- *Pseudomonas aeruginosa* **most common**
- HACEK - slow growing, fastidious organisms that may need 3 weeks to grow out of culture
 - Haemophilus sp.
 - Actinobacillus
 - Cardiobacterium
 - Eikenella
 - Kingella

Clinical picture

- Malaise, fever, night sweats, weight loss, anaemia, Chills, Anorexia, Arthralgia
- Valve destruction → heart failure
 - new/changing murmurs
- Embolic events → abscesses in brain, liver
- Immune complex deposition → vasculitis
 - arthralgia
 - glomerulonephritis

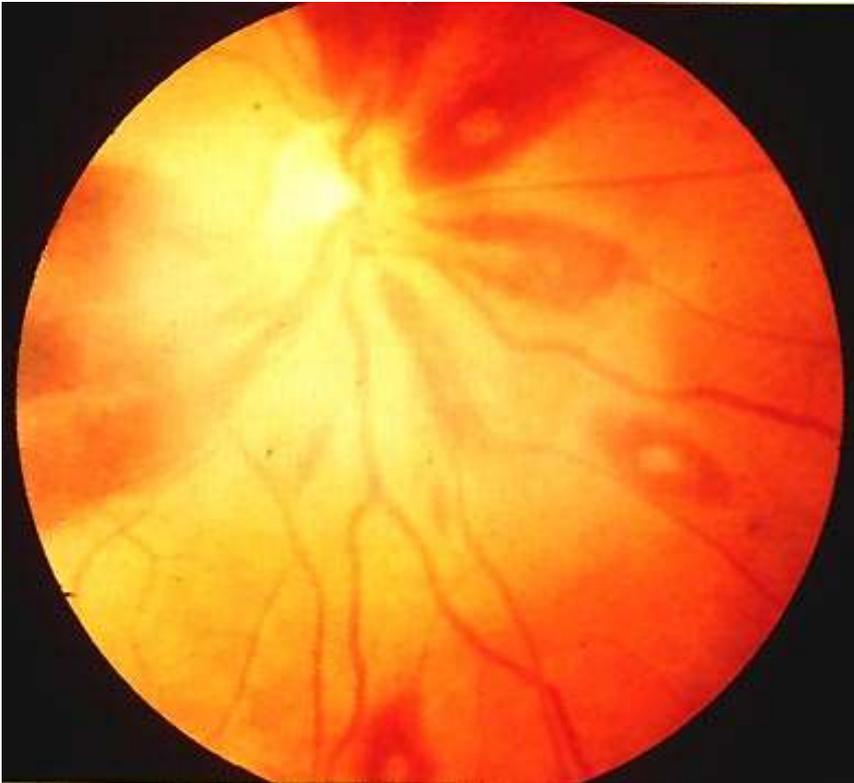
Infective Endocarditis

- Petechial Hemorrhages
- Linear (splinter) Hemorrhages
- Retinal Hemorrhages
- Osler Nodes
- Janeway Lesions
- Splenomegaly



Bleeding

- Subungual (splinter) hemorrhage
- Conjunctival hemorrhage
- Retinal hemorrhage: Roth Spot



Peripheral Manifestations

• Janeway Lesions:

- Erythematous, macular, painless haemorrhagic lesions in palm and sole.
- Septic emboli?



Osler Node



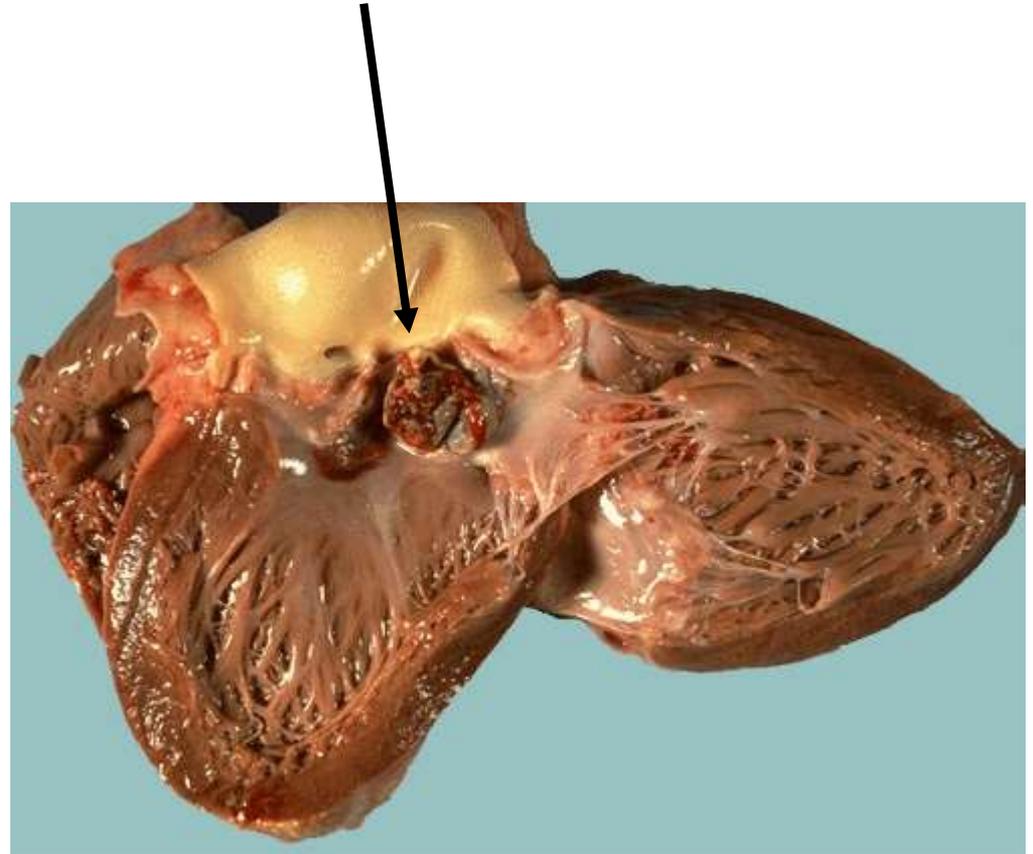
• Osler's Nodes:

- Tender, subcutaneous nodules.
- 4 P's:
 - Pink
 - Painful
 - Pea-sized
 - Fingers and toes.
- Immunologic origin?

Infective Endocarditis

Outcome

- Fatal 10-70% of cases



Lab Investigations

- Normochromic normocytic anaemia
- ↑ WCC – white cell count
- ↑ ESR – erythrocyte sedimentation rate
- Blood cultures – repeated samples, 3/24h
- Histopathology from the affected valves
- Echocardiography

Diagnosis

- Von Reyn Criteria without using Echocardiography
- Duke Criteria

Thank
You

