



CAS-206
Level 2



Infective endocarditis (IE)

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Objectives:

- List the **causative microorganisms** associated with IE
- Discuss the **risk factors** of IE
- Understand the **pathophysiology** of IE
- Outline the **clinical presentation and the course** of IE
- Discuss the **laboratory diagnosis** of IE
- Discuss the most common **microbiological characteristics** of the causative pathogens

- **Definition**: infectious inflammation of the endocardium that affects the heart valves.
- **Etiology**: The condition is a result of **bacteremia**, which is most commonly caused by dental procedures, surgery, distant primary infections, and non-sterile injections.

Risk factors

1. Rheumatic heart disease
2. IV drug use
3. Immunosuppression
4. Prosthetic heart valve
5. Congenital heart disease

Main causative pathogens:

Pathogen	Characteristics	Course of disease
<i>Streptococcus</i>	<ul style="list-style-type: none">• Normal flora of oral cavity and upper respiratory tract	<ul style="list-style-type: none">• Most common cause of <u>subacute IE</u>, especially in previously damaged heart valves
<i>viridans</i>	<ul style="list-style-type: none">• Common cause of IE following dental surgical procedures or extremely poor oral hygiene	

Main causative pathogens:

Pathogen	Characteristics	Course of disease
<i>Staphylococcus aureus</i>	<ul style="list-style-type: none">• Affects previously healthy valves• Usually fatal (if left untreated)	<ul style="list-style-type: none">• Most common cause of <u>acute IE</u>

Pathogen	Characteristics	Course of disease
<ul style="list-style-type: none">• <i>Staphylococcus epidermidis</i>• (Coagulase - ve)	<ul style="list-style-type: none">• Cause IE in patients with peripheral venous catheters, prosthetic heart valves or any prothesis	<ul style="list-style-type: none">• Common cause of <u>subacute</u>

Pathogen	Characteristics	Course of disease
<i>Enterococcus faecalis</i>	<ul style="list-style-type: none">Normal flora of human colon, urethra and female genital tractIE in patients with preexisting heart valve damage	<ul style="list-style-type: none"><u>Subacute IE</u> especially following urinary tract infections

Less common pathogens (Subacute IE)

Pathogen	Characteristics
<i>Streptococcus gallolyticus</i>	<ul style="list-style-type: none">• Normal flora of colon• IE associated with colorectal cancer in elderly and immunocompromised persons

Less common pathogens (Subacute IE)

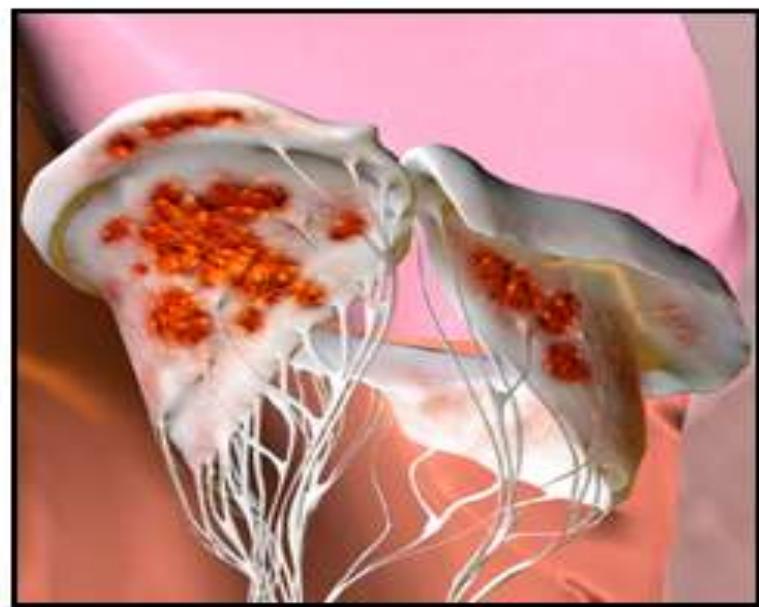
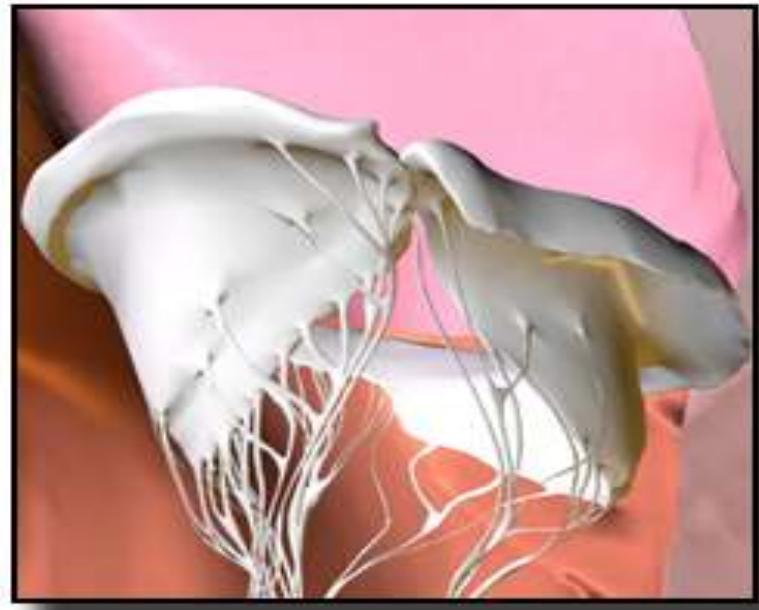
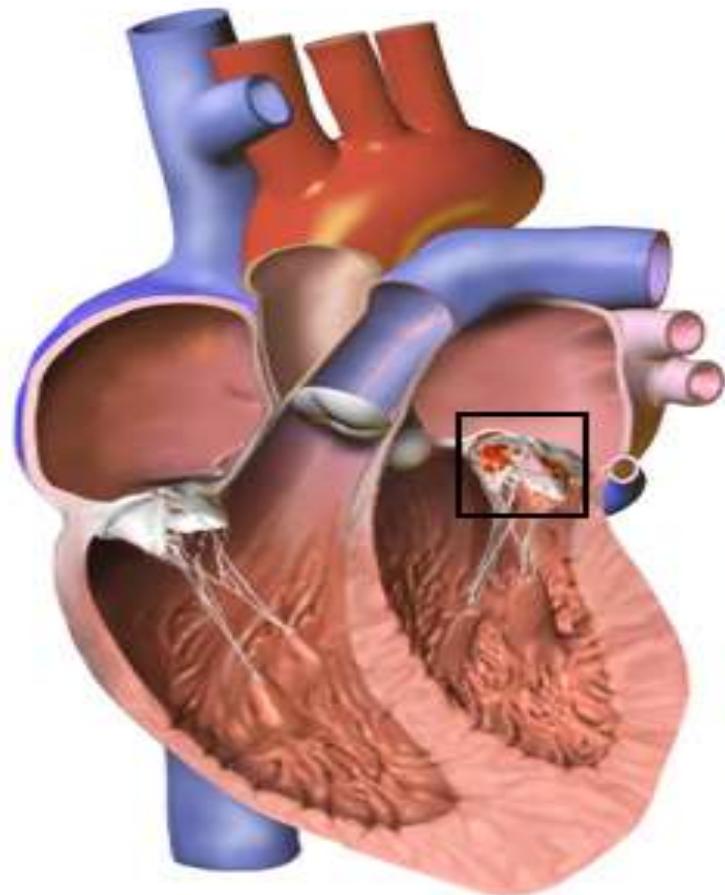
Pathogen	Characteristics
HACEK (G-ve bacilli) <ul style="list-style-type: none">• <i>Haemophylus</i>• <i>Aggregatibacter</i>• <i>Cardiobacterium</i>• <i>Eikenella</i>• <i>Kingella</i>	<ul style="list-style-type: none">• Oropharyngeal flora• IV drug users who contaminate their needles with saliva• In patients with poor dental hygiene and/or periodontal infection
<i>Candida species</i>	<ul style="list-style-type: none">• Normal flora of mucous membrane• Causes IE in immunosuppressed patients.• IE often associated with vascular catheters

Pathogenesis

1- **Valvular endothelial damage** as in cases of Rheumatic fever, Prosthetic Valve ...etc. causes **turbulent blood flow**
→ fibrin-platelet aggregate on valve

2- **Bacteremia:**

- Bacterial colonization of damaged valve
- Further depositions of fibrin & platelets → Vegetations
- Valve destruction with loss of function



- **Clinical features:**
- **Constitutional symptoms** (fatigue, fever/chills, malaise).
- **Signs of pathological cardiac changes** (e.g., new or changed heart murmur, heart failure signs).
- Possibly manifestations of subsequent damage to other organs (e.g., glomerulonephritis, septic embolic stroke).

- **Lab Diagnosis**

1. Blood cultures (**Before Antimicrobial therapy**)

- The standard test to determine the microbiologic etiology of the disease.
- Standard blood culture of **5 days** period allows recovery of most cultivable microorganisms including *Candida* and the fastidious HACEK organisms.

- **Subculture on solid media** to isolate the causative organism for its further identification (via morphology and biochemical reactions) and determination of antibiotic sensitivity pattern is mandatory.

2. Serology

3. PCR

- **Prophylaxis:** Antibiotics are only administered in specific circumstances, e.g., in patients with preexisting heart conditions undergoing dental or surgical procedures.
- **Prognosis:** If left untreated, infective endocarditis can be fatal within a few weeks.



TIME FOR QUESTIONS

MCQ:

1- Which of the following is not a character of staphylococcal infective endocarditis?

- A.Large vegetations seen on the valves
- B.Affects pre-damaged valves
- C.Most common cause of acute IE for all groups
- D.If left untreated becomes fatal within 6 weeks

Which group of patients is risky for *Streptococcus gallolyticus* infective endocarditis?

- A. IV drug users who contaminate their needles with saliva
- B. Patients with colorectal cancer
- C. Patients in close contact with pets
- D. Patients with poor dental hygiene

Enumerate:

- A. Three of the most common pathogens causing infective endocarditis.
- B. The standard test for diagnosis of infective endocarditis.
- C. Two risk factors for infective endocarditis.

Complete:

Regarding the clinical course, *S. aureus* causesIE
while *Strept. viridans* causesIE

