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# Pathology CVS

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# VALVULAR HEART DISEASE- 2
# Infective Endocarditis

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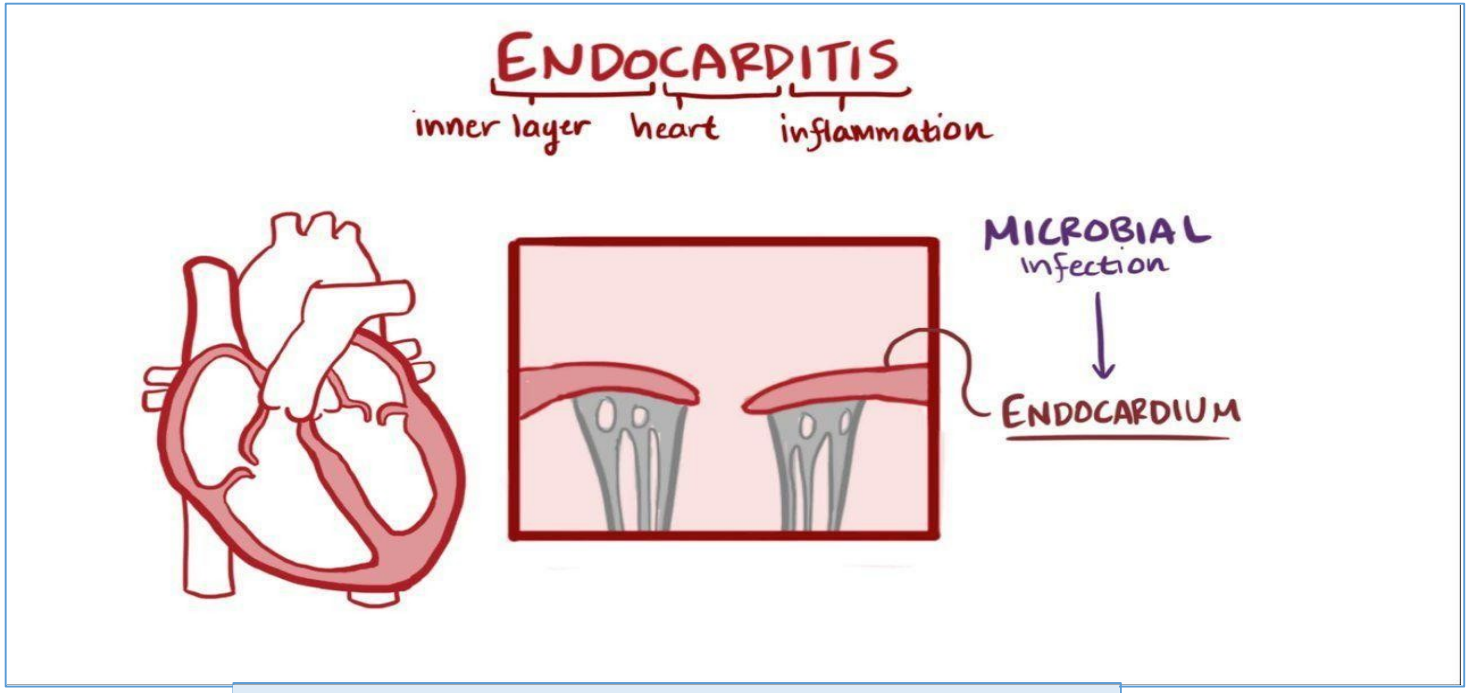
# Infective Endocarditis (IE)

- Microbial (mostly bacterial*) invasion of heart valves and endocardium

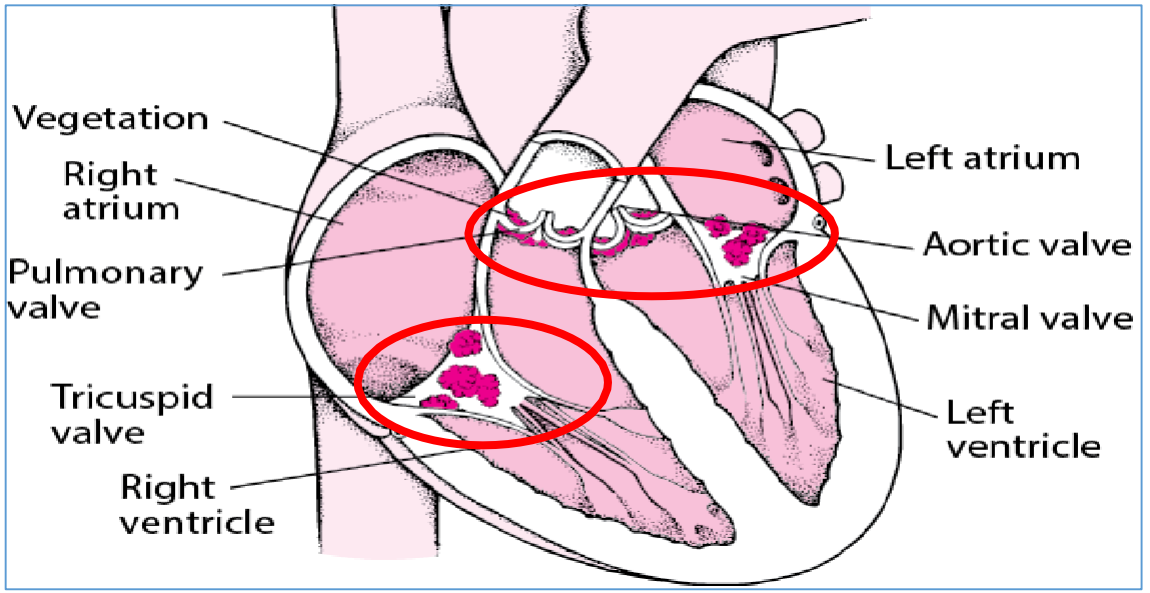
So it's a bacterial infection affecting the endocardium especially the endocardium covering the heart valves

- bulky, friable ***vegetations*** (necrotic debris+ thrombus+ organisms).

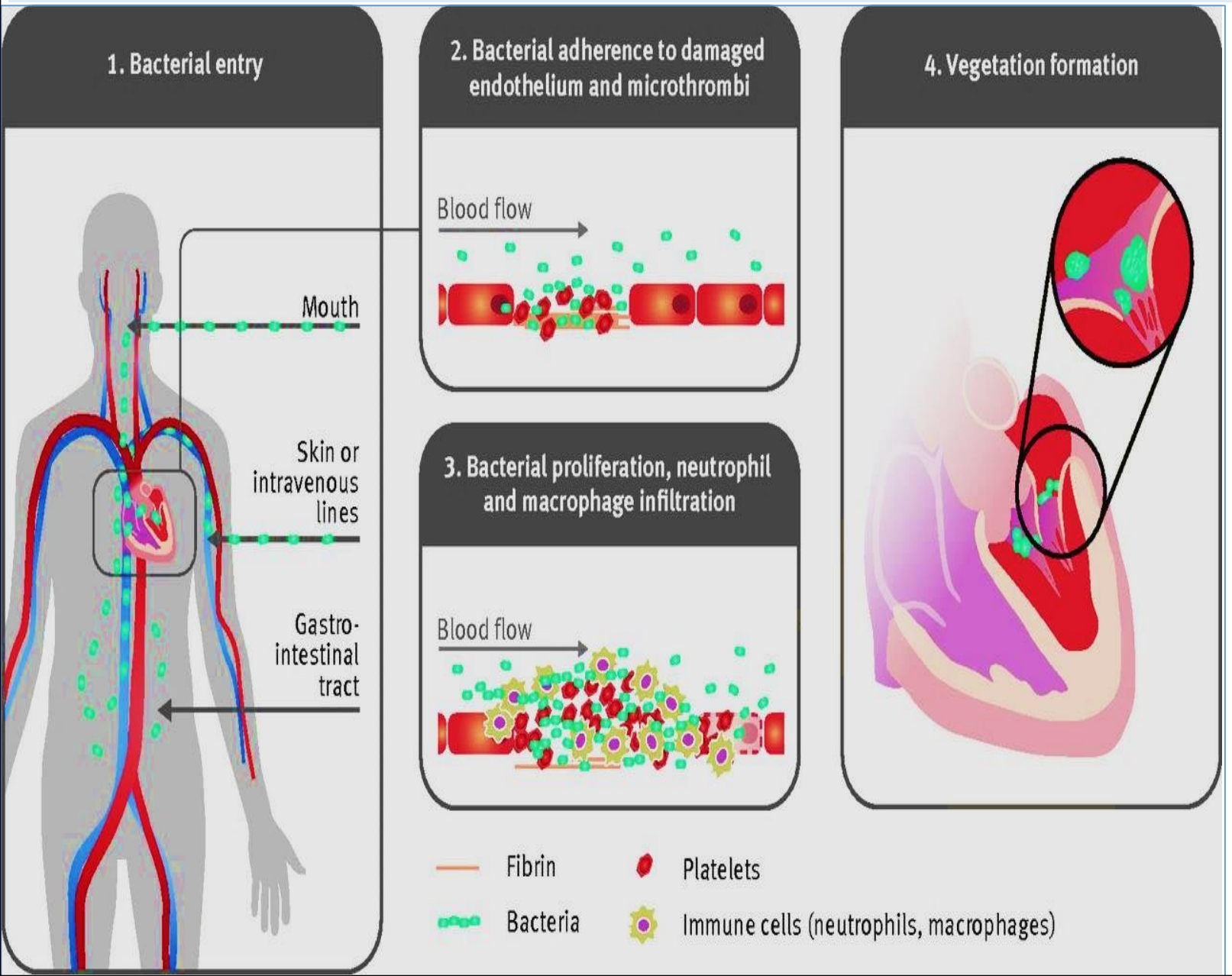
* others include: fungi, rickettsiae; and chlamydia




**Infection of heart valves and endocardium**



# Infective Endocarditis
(Infection of heart valves and endocardium)




The organisms reach the heart from the circulation so probably the patient has sepsis and from there the bacteria gets access to the heart endocardium in which bacteria will proliferate and produce inflammatory processes bringing neutrophils and macrophages then thrombus formation because of endocardial injury so we end having vegetations

So, What are the possible consequences of vegetations?

1) Functional valve abnormalities especially regurgitation
2) Embolisms, infarction and vascular occlusion
3) Abscesses because these thrombi are seeding different locations with these organisms
4) Mycotic aneurysms due to vascular walls infections

# Infective Endocarditis- Risk Factors

- Congenital heart disease
- Acquired heart disease (including rheumatic fever)

Especially valve heart diseases

Why? Because the valve is damaged so will be more vulnerable to infections and infective endocarditis

- Indwelling vascular catheters
- Intra-cardiac devices & prostheses

These synthetic materials are not viable tissues so the immune response will be difficult and the bacteria itself have the ability to adhere, proliferate and grow overlying these materials

& Access for bacteria and microorganisms

- Immunodeficiency

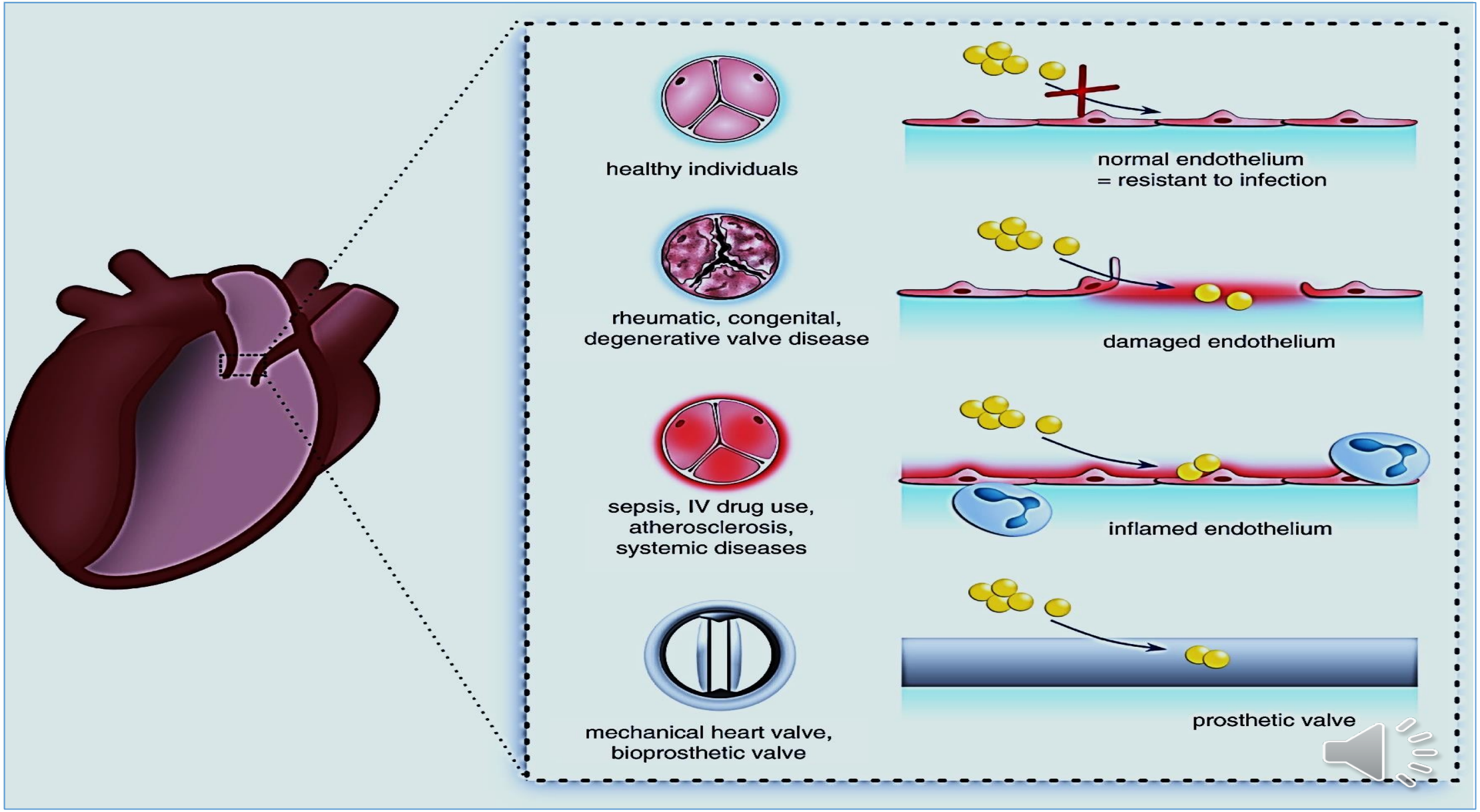
All immune compromised people are at risk for all infections including infective endocarditis

- I.V. drug use/ abuse

Access for bacteria and microorganisms

- Septicemia
- ? Dental procedures (in patients with risk factors)

Access for bacteria ( tooth extraction, bleeding) & the patient's normal flora can get access
But do such these procedures are risk factors? No , but patients with a risk factor for infective endocarditis should be aware of that and use prophylactic antibiotics before the dental procedure

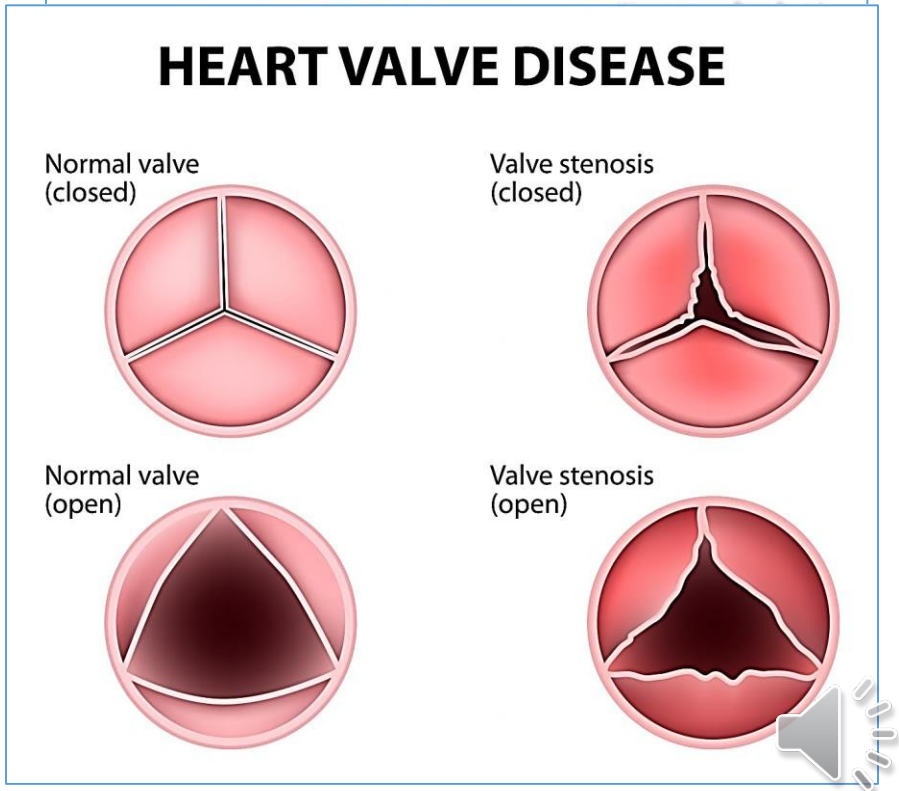

healthy individuals
normal endothelium
= resistant to infection
rheumatic, congenital,
degenerative valve disease
damaged endothelium
sepsis, IV drug use,
atherosclerosis,
systemic diseases
inflamed endothelium
mechanical heart valve,
bioprosthetic valve
prosthetic valve

# Infective Endocarditis (IE)

Classified into ***acute*** and ***subacute*** based on: Depending on the duration and severity for manifestations

1) the virulence of microorganism How bad it's?

2) presence of underlying cardiac disease



| Feature | Acute endocarditis | Subacute endocarditis |
|---|---|---|
| Virulence | highly virulent organism | low virulent organism |
| Most common organism | Staph. aureus | Streptococcus viridans |
| Underlying cardiac disease | previously normal valve | previously abnormal valve (scarred or deformed) |
| Clinical course | rapidly developing<br>Within days | Insidious disease |
| Outcome | High morbidity and mortality<br>Bad | most patients recover after appropriate antibiotic therapy |

Part of the normal flora of the oral cavity and mucous membrane

Slowly progressive , not ver apparent
Several week,>6 weeks

Congenital heart diseases or previous rheumatic fever

# Infective Endocarditis- Clinical Features

**Clinical manifestations**

- Fever, chills, weakness, and murmurs

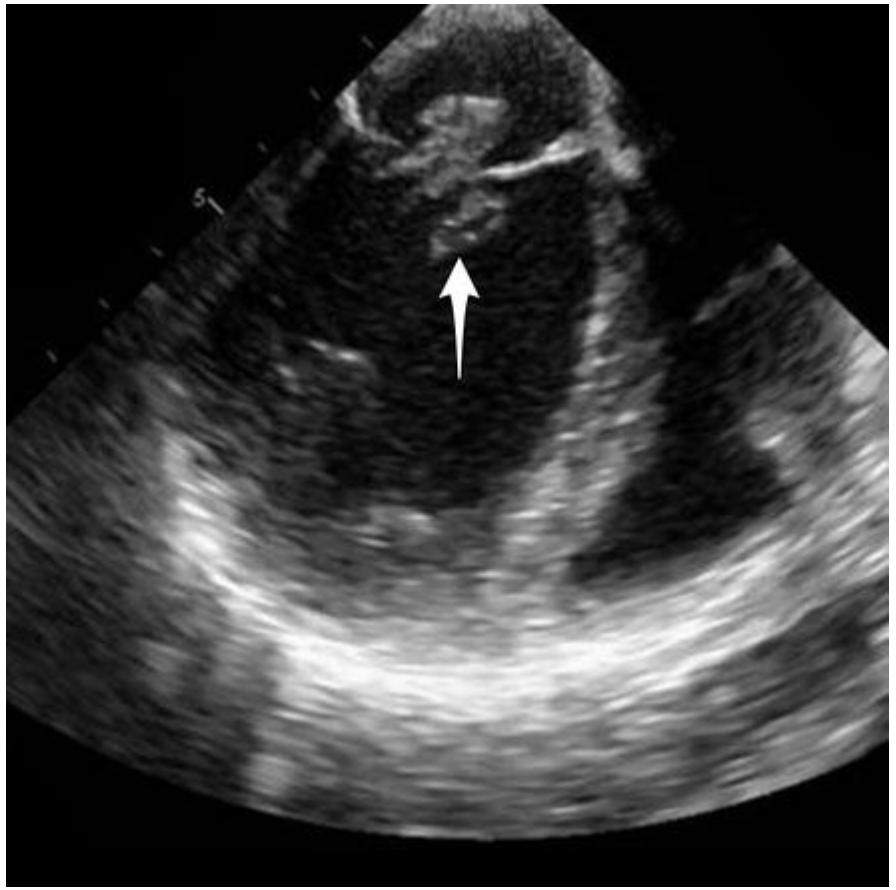
  And maybe congestive heart failure

- **Valve vegetations can cause emboli** in different target tissues

- **Diagnosis* = (positive blood cultures + echocardiographic (echo) findings)**

Not only for the confirmation of the diagnosis but also to know what the appropriate antibiotic to use

- * depends on certain criteria….

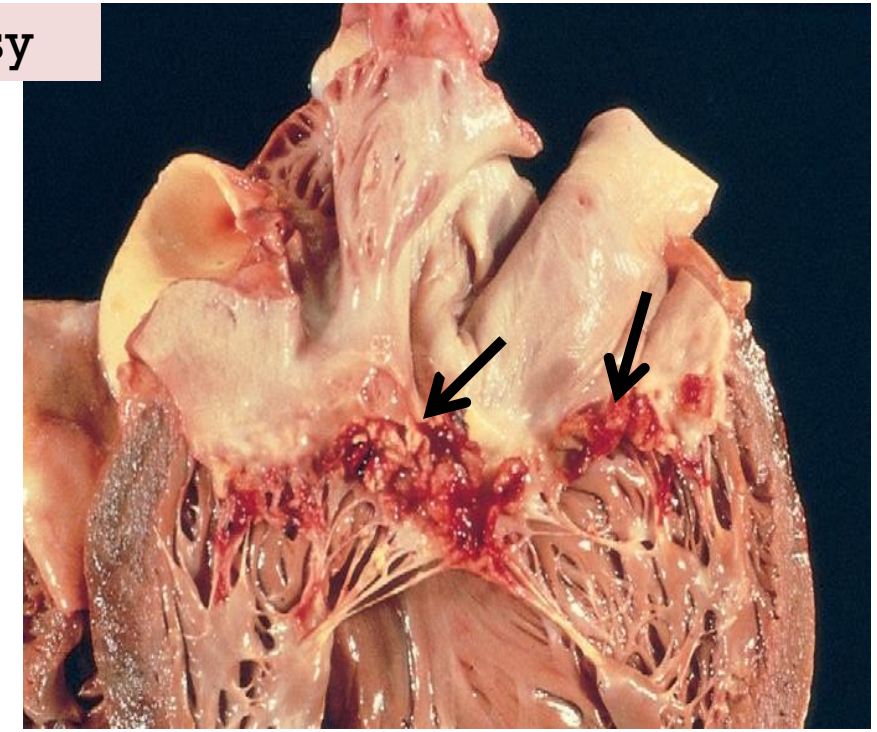


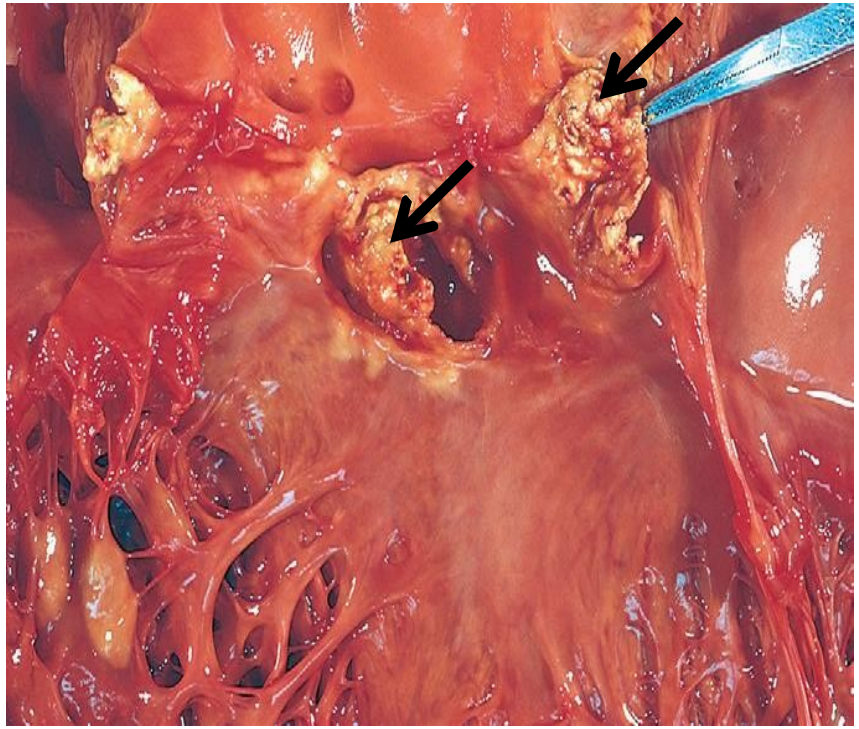
# Infective Endocarditis- Morphology

- **Friable, bulky, and destructive vegetations** on heart valves
- Most common: aortic and mitral valves
- Tricuspid valve common in I.V. drug abusers

Venous >> right side of the heart >> tricuspid valve

Autopsy





# Clinical Features

- **<u>Complications of IE vegetations:</u>**

1 emboli

2 abscesses

3 septic infarcts

4 mycotic aneurysms

- **Treatment**: long-term (≥ 6 weeks) I.V. antibiotic therapy and/or valve replacement

Antibiotic Treatment depends on the sensitivity of the microorganisms

This pic is Not included

# Infective Endocarditis: Diagnosis

Just for reading (clinical related )

## Duke Criteria

- 1994 a group at Duke University standardised criteria for assessing patients with suspected endocarditis
- **Definite**
  - 2 major criteria
  - 1 major and 3 minor criteria
  - 5 minor criteria
  - pathology/histology findings
- **Possible**
  - 1 major and 1 minor criteria
  - 3 minor criteria
- **Rejected**
  - firm alternate diagnosis
  - resolution of manifestations of IE with 4 days antimicrobial therapy or less

## Modified Dukes' criteria

- **Major-**
  - 2 positive blood cultures, for an organism known to cause IE
    or
    persistent bacteremia- 2 +ve 12 hours apart or 3 of 4 +ve drawn over 1 hour
  - ECHO evidence- oscillating mass on valve or supporting structures
    or abscess
    or new valvular regurgitation or partial dehiscence of prosthetic valve
- **Minor-**
  - Predisposing factor- cardiac lesion, IVDU
  - Fever >38 °C
  - Vascular phenomenon
  - Immunologic phenomenon
  - +ve blood culture
  - +ve ECHO

# Let’s find out?

- Are all people with streptococcal pharyngitis exposed to risk of rheumatic fever?
- In what ways are rheumatic fever and infective endocarditis similar?
- What is different between rheumatic fever and infective endocarditis ?