VALVULAR HEART DISEASE

- **Stenosis** : *failure of a valve to open completely, obstructing forward flow.*

  - almost always due to a chronic process (e.g., calcification or valve scarring).

- **Insufficiency** *: failure of a valve to close completely → regurgitation (backflow) of blood.*
- *It* can result from **disease of** either:
  - **valve cusps (e.g., endocarditis)**

  Or - supporting structures (e.g. mitral annulus, tendinous cords, papillary muscles)

  •It can be either:
  - **Acute→ e.g. chordal rupture**
  - **chronic→ e.g. scarring and retraction**

Clinical signs of valve disease:

- abnormal heart sounds called ***murmurs***
- palpated heart sound (***thrills)*** →severe lesions
- specific clinical signs according to involved valve

- Valvular abnormalities can be congenital or acquired.

- The most common **congenital** valvular lesion is ***bicuspid aortic valve***

- mitral valve is the most common target of acquired valve diseases.
- most important causes of acquired valvular diseases are **post-inflammatory scarring** of the mitral valves and aortic valve due to (rheumatic fever)→ 2/3 of all

- **bicuspid aortic valve**:

- only two functional cusps instead of the normal three
- 1% to 2% of all live births
- associated with a number of genetic mutations
- early life → Asymptomatic
- Later → early and progressive degenerative calcification

Rheumatic fever- Rheumatic Valvular Disease

- immune- mediated inflammatory disease following **group A β-hemolytic streptococcal** infections (usually pharyngitis; rarely skin infection).
- **PATHOGENESIS**: a **hypersensitivity reaction due to antibodies against group A streptococcal antigenes that are cross-reactive with host antigens**
- ***Consequence*: *valvular inflammation and scarring***

Rheumatic fever

- Manifestations are seen a few weeks after the pharyngitis or skin infection.

- Major organs involved: heart; joints; skin; and brain.

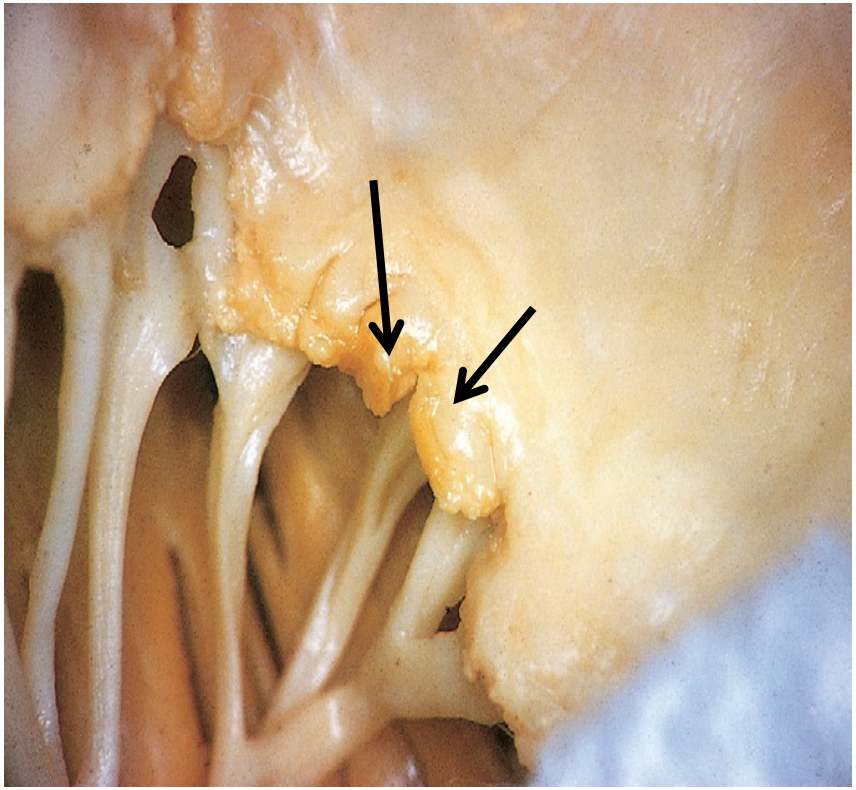
Acute rheumatic fever- clinical picture

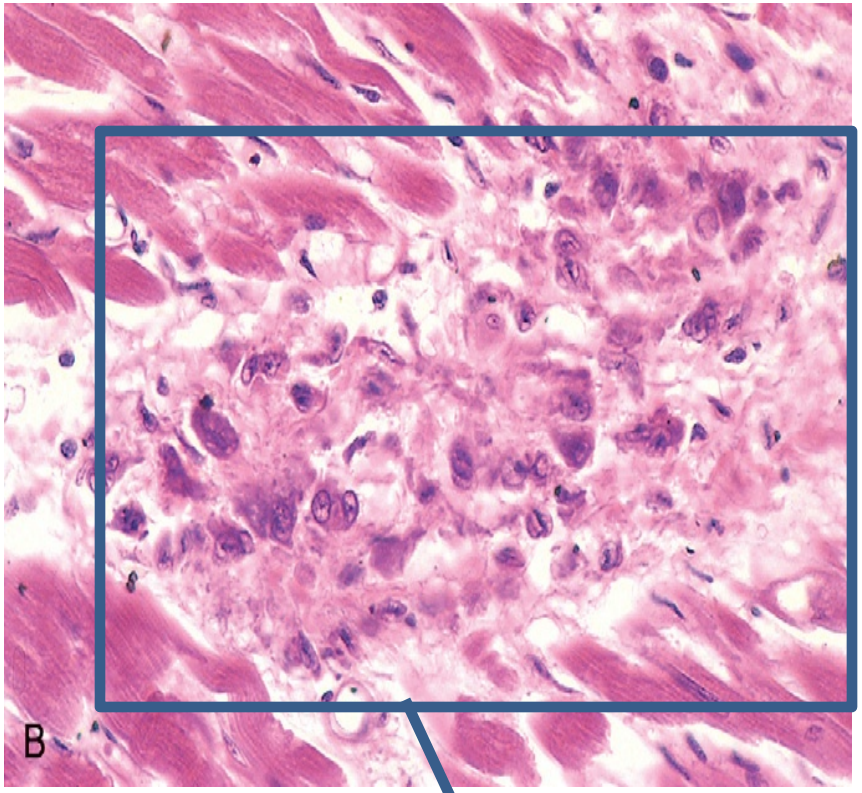
- 80% of cases are children
- fever; migratory polyarthritis; carditis.
- Carditis→ arrhythmias; myocarditis; cardiac dilation; functional mitral insufficiency and CHF.
- Elevated serum titers of streptococcal antigens (streptolysin O; DNA-ase)
- **cultures for streptococci are (-) at the time of symptom onset**

MORPHOLOGY- acute phase

- discrete inflammatory lesions in affected tissues.
- cardiac lesions = **Aschoff bodies** are *pathognomonic* for rheumatic fever (collections of T lymphocytes, plasma cells, and activated macrophages)
- Acute Valve involvement → regurgitation

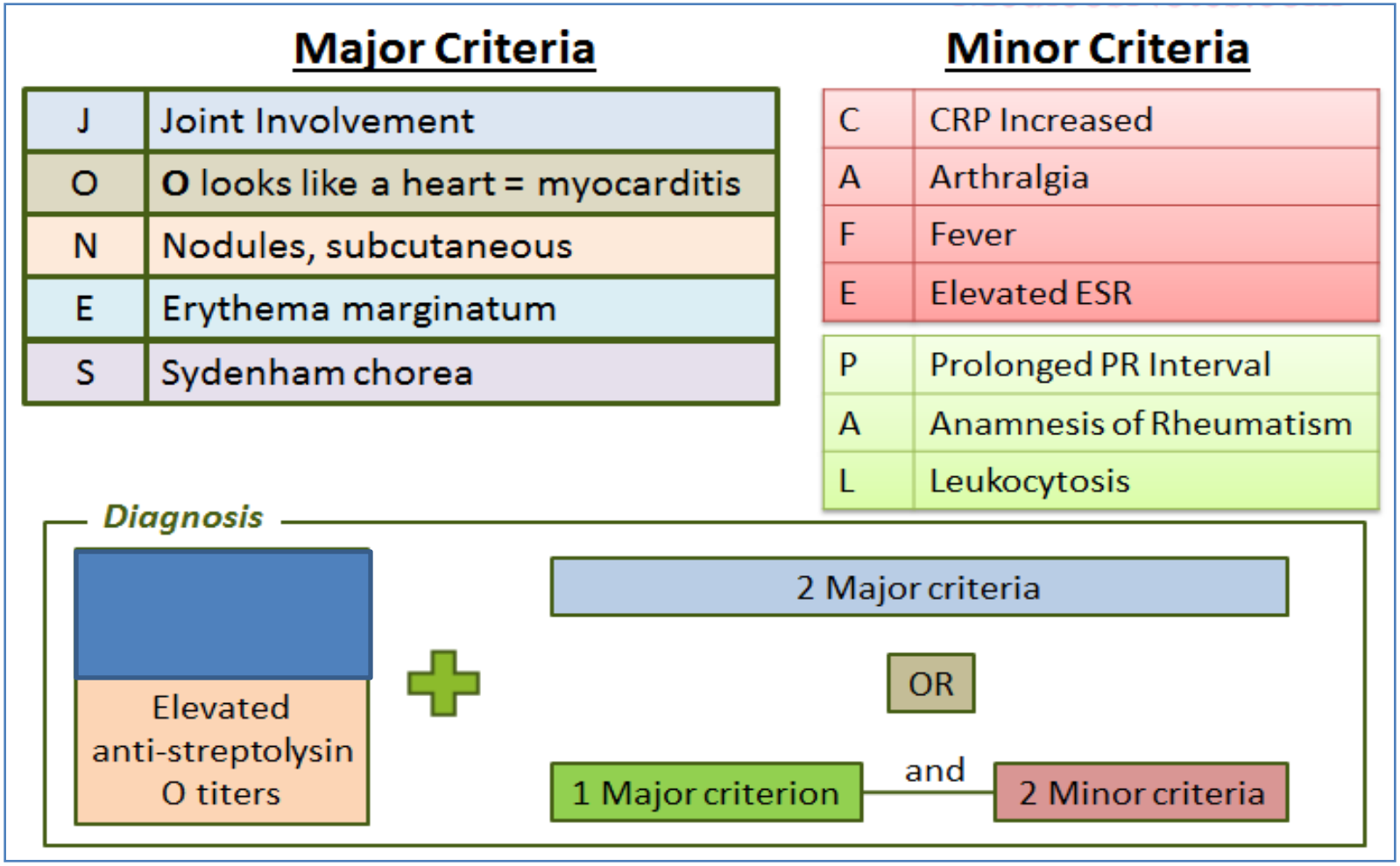
Acute rheumatic heart disease





Aschoff bodies

The diagnosis of acute rheumatic fever



chronic rheumatic carditis- clinical picture

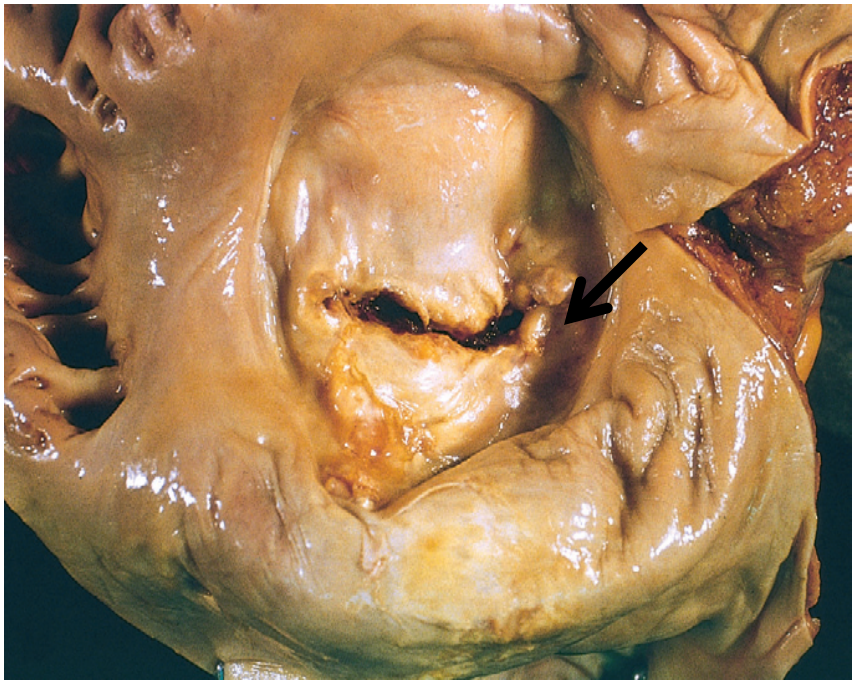
- **Onset: years or decades** after initial acute episode
- sympotms: -cardiac murmurs
  - CHF - arrhythmias (esp. A. fib.)
  - thromboembolism (mural thrombi).
- Prognosis: variable.
- Management: Surgical repair or replacement of diseased valves

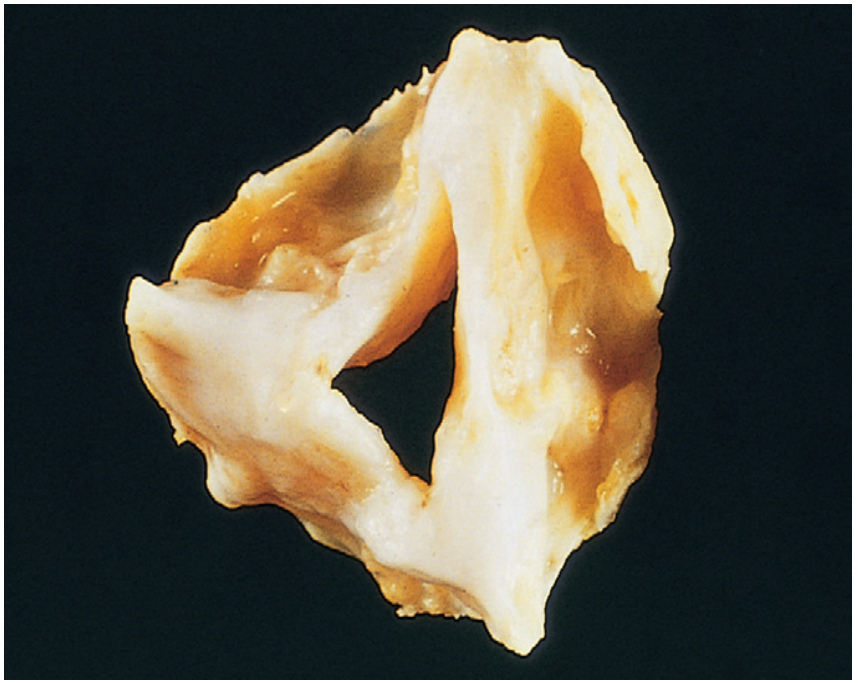
Chronic phase- morphology

- Inflammation is replaced by scarring
- Aschoff bodies **rarely** seen now

- Consequence → **stenosis (**most important functional consequence of chronic RHD)
  - **mitral** valve alone: 70% of cases (most common)
  - combined mitral and aortic disease: 25%
  - tricuspid valve: less frequent, less severe
  - **pulmonary** valve: rarely involved

Chronic rheumatic heart disease





Infective endocarditis (IE)

- Microbial (mostly bacterial*) invasion of heart valves and endocardium
- bulky, friable ***vegetations*** (necrotic debris+ thrombus+ organisms).

* : others include fungi, rickettsiae; and chlamydia

Infective endocarditis (IE)

- classified into ***acute*** and ***subacute*** based on:

1- the virulence of microorganism

2- presence of underlying cardiac disease

Features	Acute endocarditis	Subacute endocarditis
Virulence	a 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	Insidious disease
Outcome	High morbidity and mortality	most patients recover after appropriate antibiotic therapy

MORPHOLOGY

- **friable, bulky, and destructive vegetations** on heart valves
- most common: aortic and mitral valves
- tricuspid valve common in I.V. drug abusers.
- Complications of vegetations:

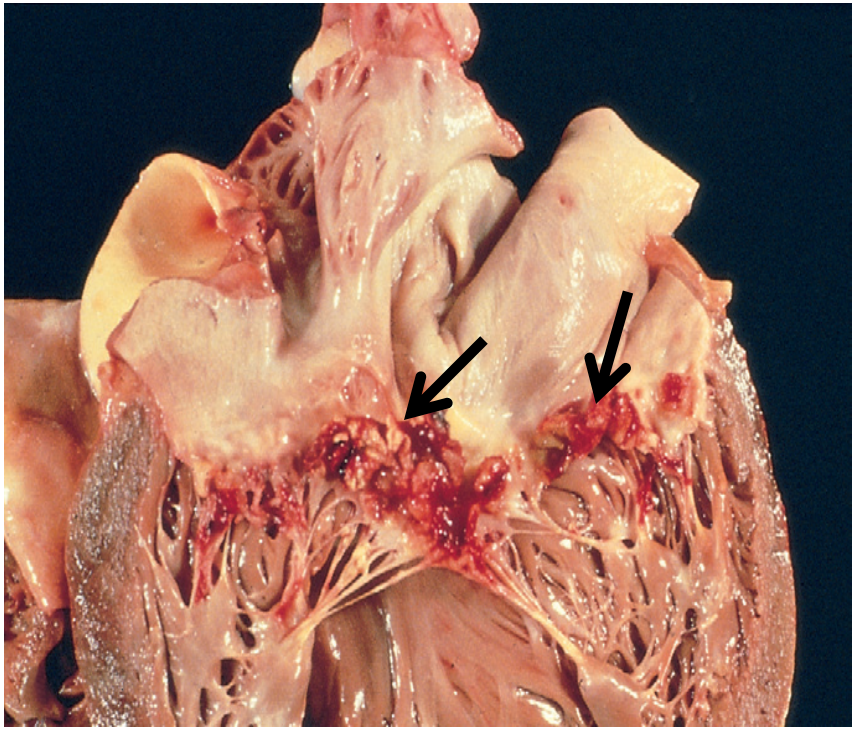
1- **emboli**

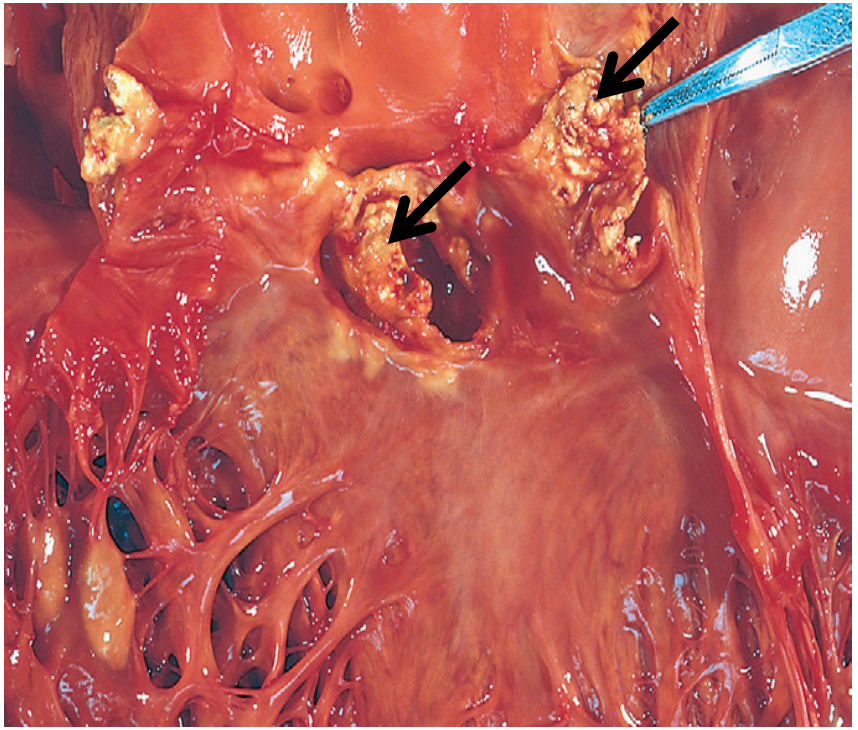
2- **abscesses**

3- **septic infarcts**

4- **mycotic aneurysms**

Infective endocarditis (IE)





Clinical Features

- fever, chills, weakness, and murmurs
- **Fever** is the most consistent sign of infective endocarditis (almost 100%)
- **emboli** in different target tissues
- **Diagnosis = (positive blood cultures + <u>echocardiographic</u> (echo) findings)**
- **Treatment**: long-term (≥ 6 weeks) antibiotic therapy and/or valve replacement