



the Sounds

# Cardiology

Mitral Stenosis and Derivatives:  
Part II: Pathology  
(i.e. Rheumatic Fever)

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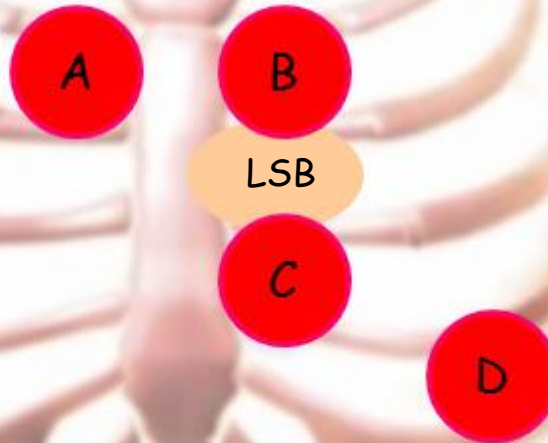
## Valve Questions

Location (60→70%)

Systolic v Diastolic (50%)

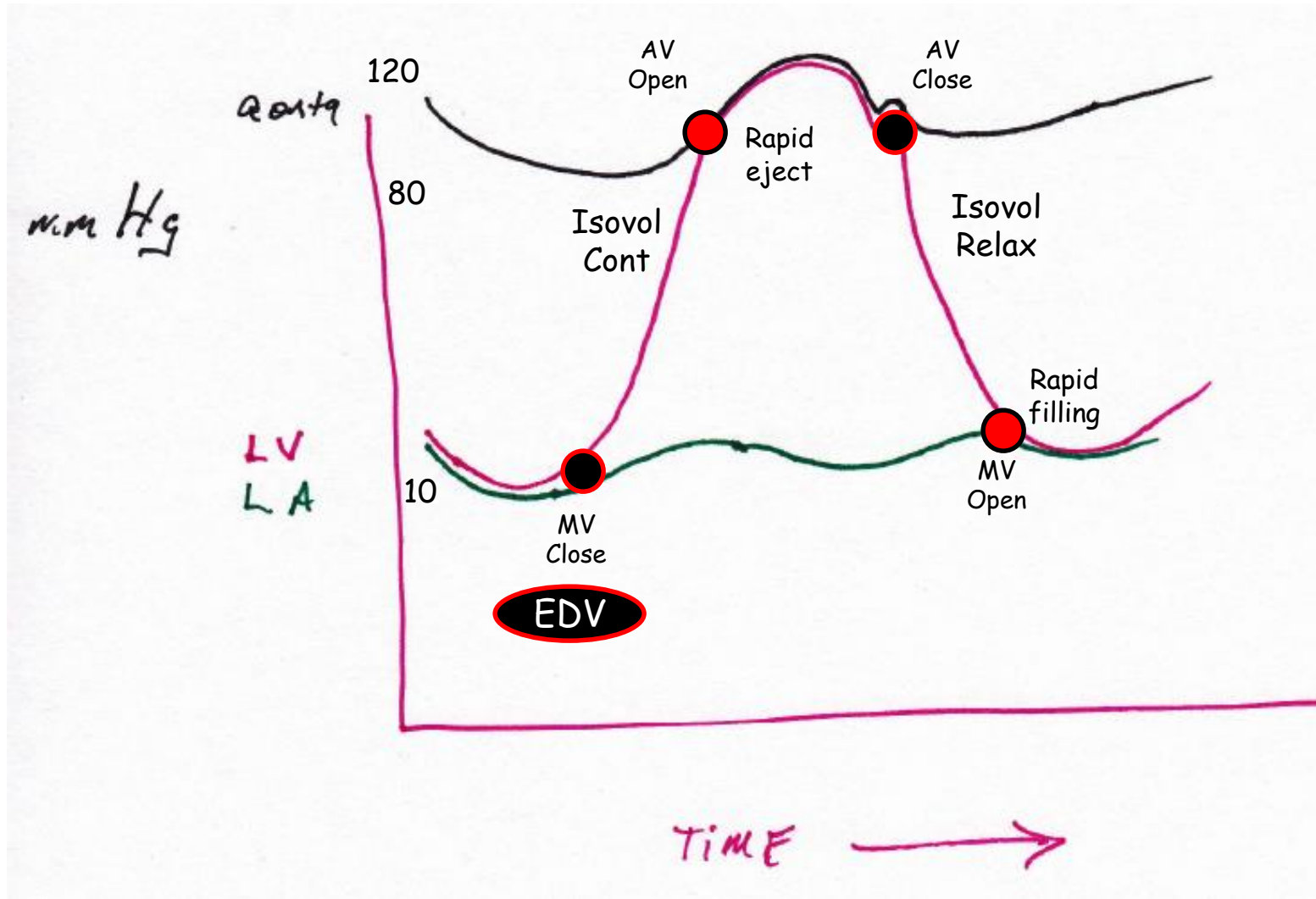
Maneuvers (20%)

Murmur v Sound (10%)

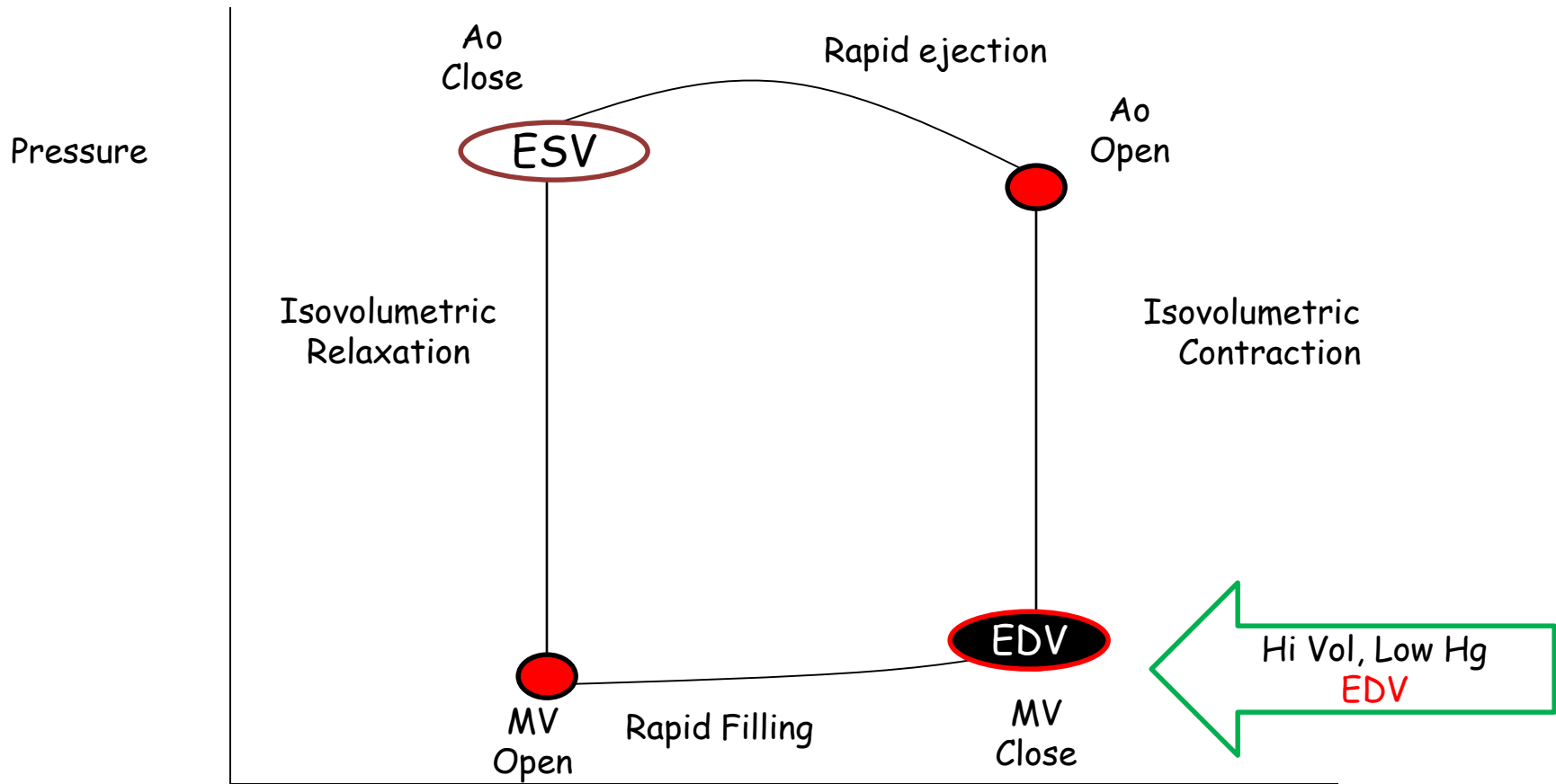


Let's Keep This Our Little Secret...

# Cardiac Cycle



# LV Pressure-Volume Loop



# LV Pressure-Volume Loop

Volume

## Mitral Valve, Stenosis:

Location

Diastolic

Hemodynamics:

PCWP

Cardiac Cycle

Pressure Volume Curve

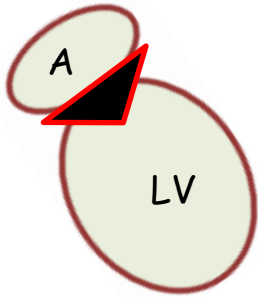
Opening Snap

Pathology

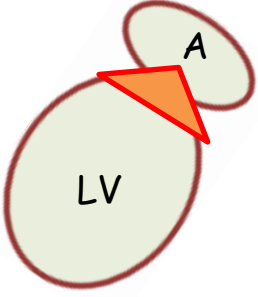
Microbiology (Rheumatic Fever)

Complications (*A fib* and derivatives)

# The Valves



Mitral  
(apex, S1)



Prolapse  
(midsystolic click, maneuvers)

Stenosis  
(diastolic, opening snap)

Regurgitation  
(systolic → axilla)

Murmurs

Sound

Diastolic (soft)

Systolic (harsh)

What Causes That Low Grade, Diastolic Murmur with an Opening Snap?

Acute  
Rheumatic  
Fever  
(MS is late manifestation)

## Acute Rheumatic Fever (5)

Acute **Immune-Mediated** Rheumatoid Carditis  
(with known **trigger**)  
-Sachs, 2016

(and subacute **neuro twitching** with **late valvular stenosis**)  
-Sachs, a little later in 2016



# Acute Rheumatic Fever (5)



Acute  
Pancarditis (DCM)  
Valvulitis (MR/AI)  
Cause of Death



Sydenham  
Chorea



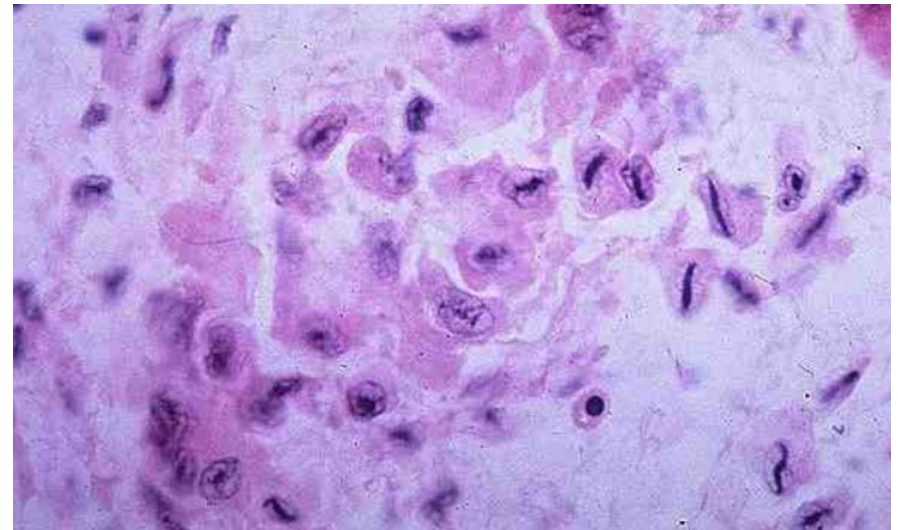
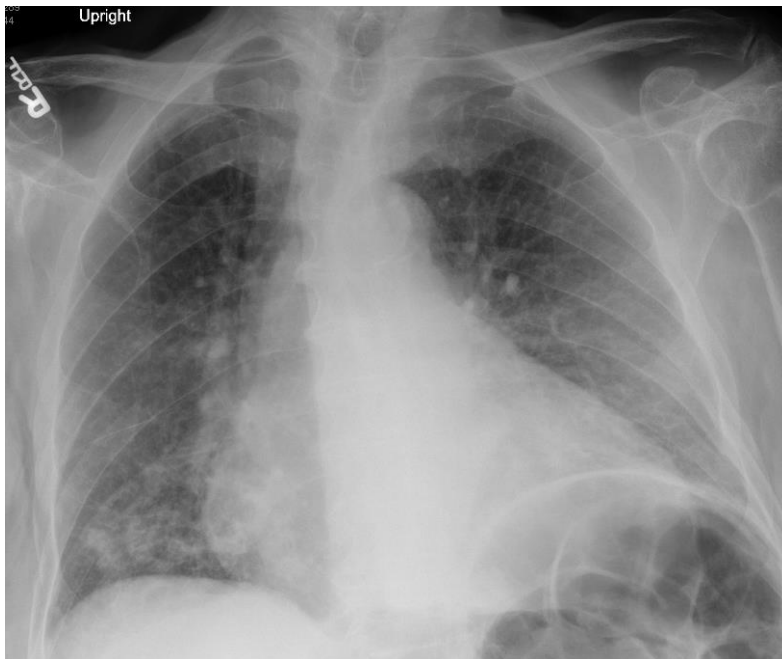
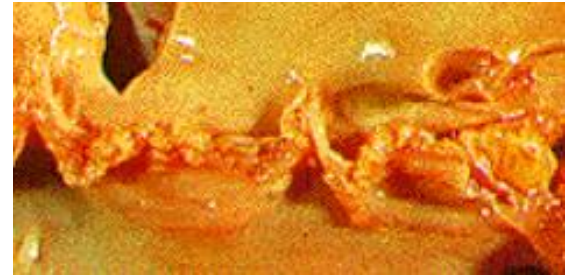
Fleeting  
Nonerosive



Skin Criteria (2)

## Acute Rheumatic Fever (5)

Acute  
Pancarditis (DCM)  
Valvulitis (MR/AI)  
(Cause of Death)



Aschoff Body (with Anitschkow cells)

## Acute Rheumatic Fever (5)



Fleeting  
Nonerosive

Acute  
Pancarditis (DCM)  
Valvulitis (MR/AI)  
Cause of Death

## Acute Rheumatic Fever (5)



Fleeting  
Nonerosive

Acute  
Pancarditis (DCM)  
Valvulitis (MR/AI)  
Cause of Death



Skin Criteria (2)

Erythema  
Marginatum

Subcutaneous  
(Rheumatoid) Nodules

## Acute Rheumatic Fever (5)

### Rheumatoid Nodule:

*Central (fibrinoid) necrosis rimmed by palisading histiocytes*



Skin Criteria (2)

Erythema  
Marginatum

Subcutaneous  
(Rheumatoid) Nodules

# Acute Rheumatic Fever (5)



Fleeting  
Nonerosive

Acute  
Pancarditis (DCM)  
Valvulitis (MR/AI)  
Cause of Death



Skin Criteria (2)



Sydenham  
Chorea

# Acute Rheumatic Fever (5)



Acute  
Pancarditis (DCM)  
Valvulitis (MR/AI)  
Cause of Death



Sydenham  
Chorea



Fleeting  
Nonerosive



Skin Criteria (2)



# Acute Rheumatic Fever (5)

Fever

~~Minor Criteria~~

ASLO



Fleeting  
Nonerosive



Pancarditis (DCM)  
Valvulitis (MR/AI)  
Cause of Death

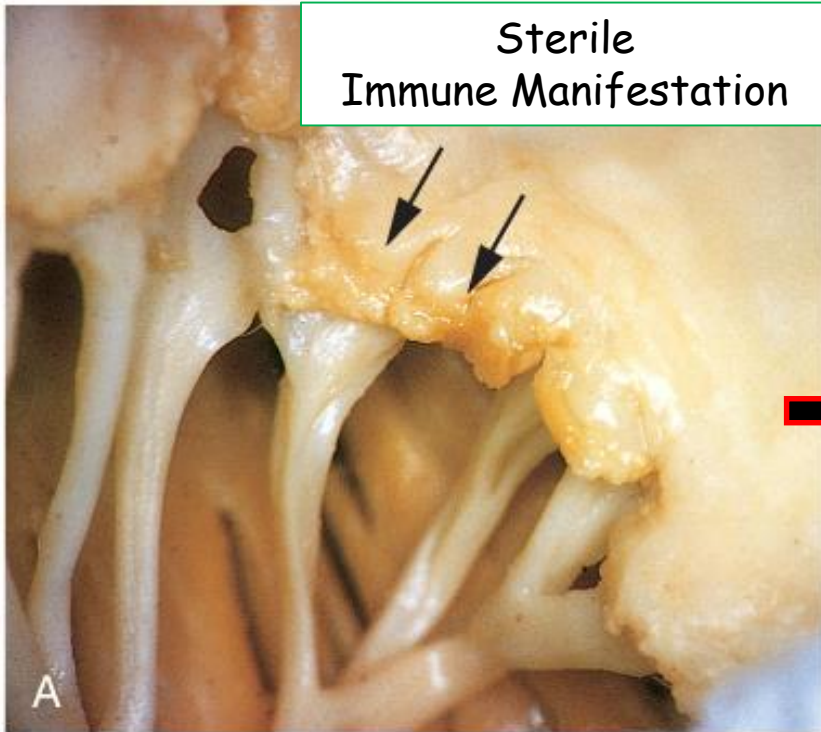


Sydenham  
Chorea

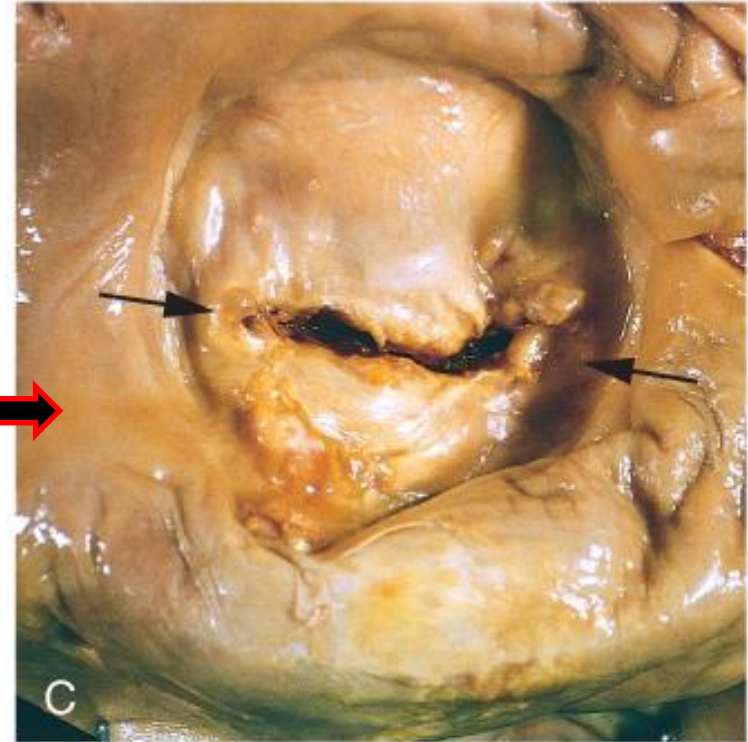
Skin Criteria (2)



## Immunopathology: Valvulitis

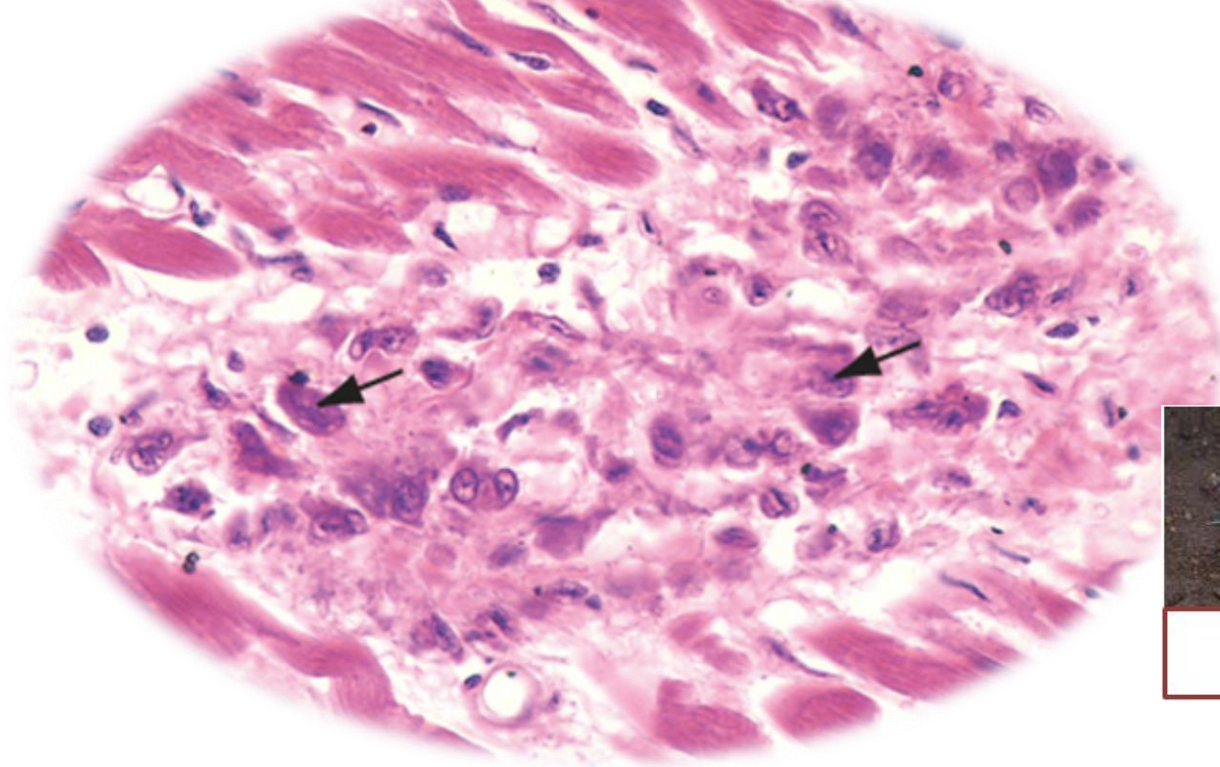


Verrucae present along line of closure 2° recurrent **valvulitis**



Mitral Stenosis:  
Commissure Fusion

## Aschoff Body: mixed mononuclear infiltrate



Distractor

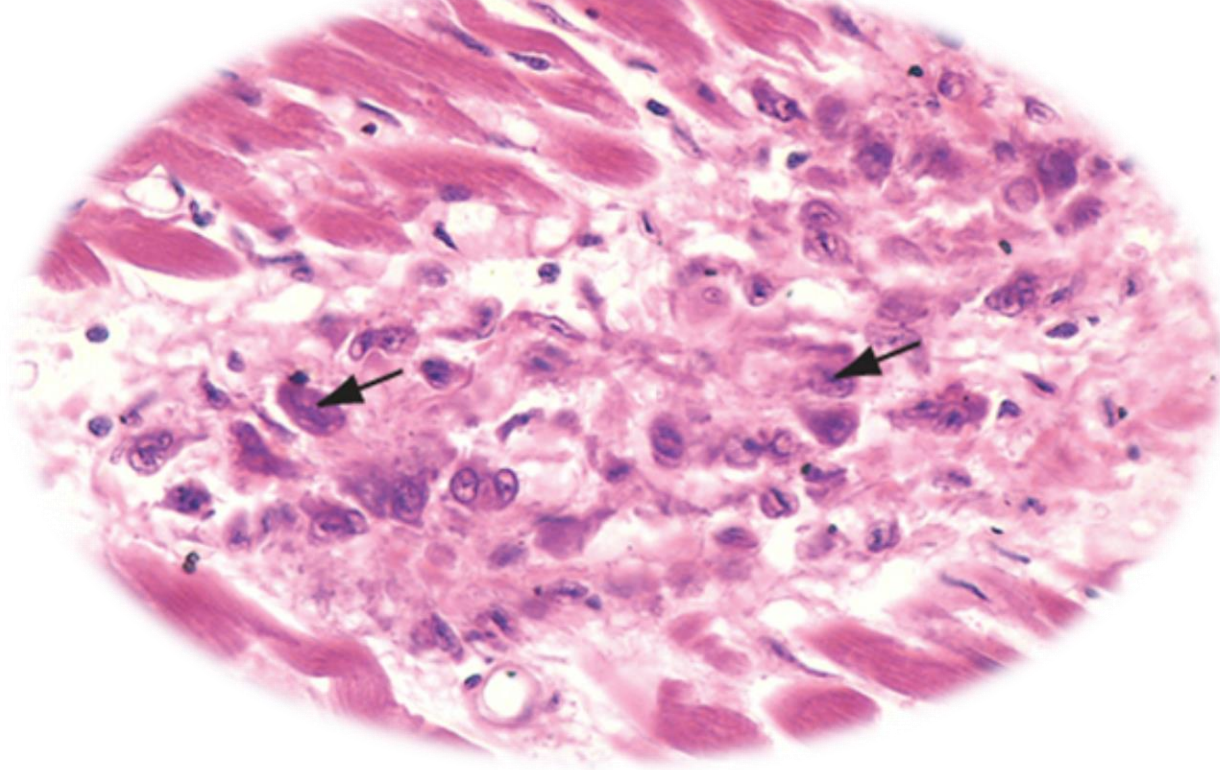


Anitschkow Cell

### Aschoff Body:

- Present in a patient with **acute** rheumatic carditis.
  - A circumscribed nodule of mononuclear inflammatory cells with associated necrosis
- *Anitschkow cells*: MΦ within the nodule possessing condensed chromatin

## Aschoff Body: mixed mononuclear infiltrate

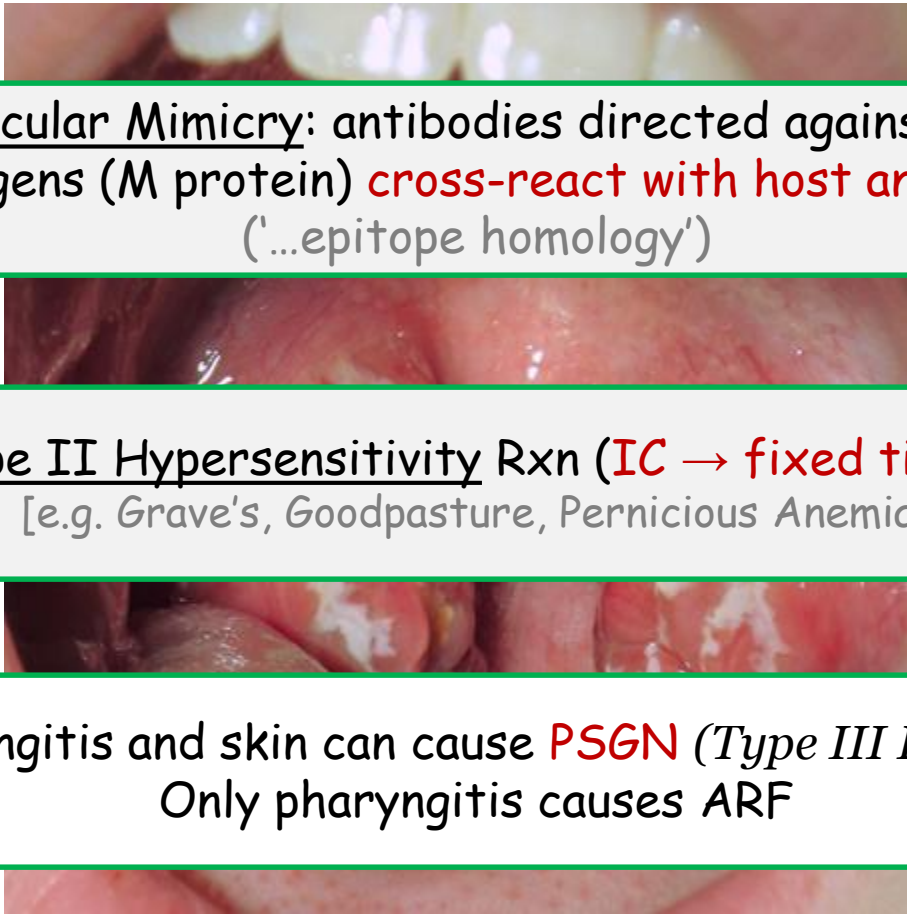


### Aschoff Body:

1. Confirm the diagnosis of Acute Rheumatic Carditis
2. Distinguish from other myocarditis [Chagas, viral, hemochromatosis (Prussian blue)]
3. Immunopathology derivatives (Type II hypersensitivity reaction, molecular mimicry, etc)



Grp A  $\beta$ -hemolytic strep aka Strep Pyogenes  
[bacitracin sensitive, PYR (+)]



Molecular Mimicry: antibodies directed against GAS antigens (M protein) **cross-react with host antigens** ('...epitope homology')

Type II Hypersensitivity Rxn (**IC**  $\rightarrow$  **fixed tissue**)  
[e.g. Grave's, Goodpasture, Pernicious Anemia]

Pharyngitis and skin can cause **PSGN** (*Type III HSN Rx*)  
Only pharyngitis causes ARF

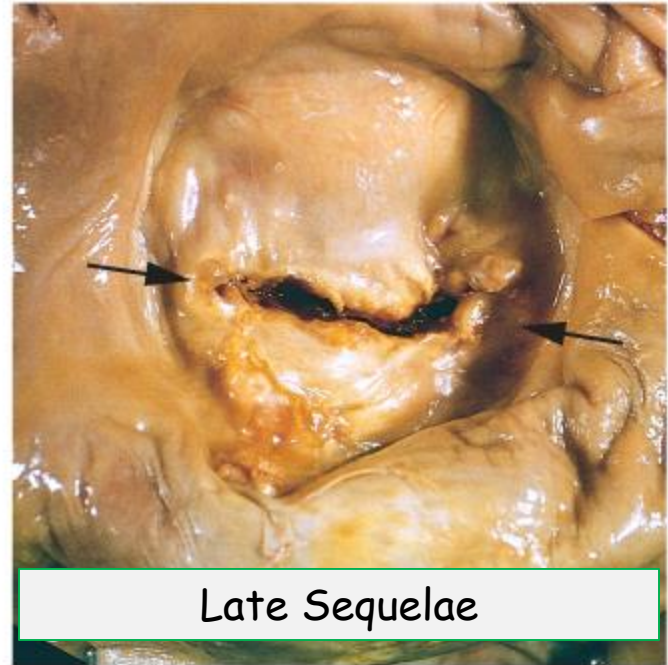
Grp A  $\beta$ -hemolytic strep aka Strep Pyogenes  
[bacitracin sensitive, PYR (+)]



Who gets **recurrent GAS**?

**Crowded & Poverty**

Look for the **immigrant, Eastern European/South American** with a murmur...



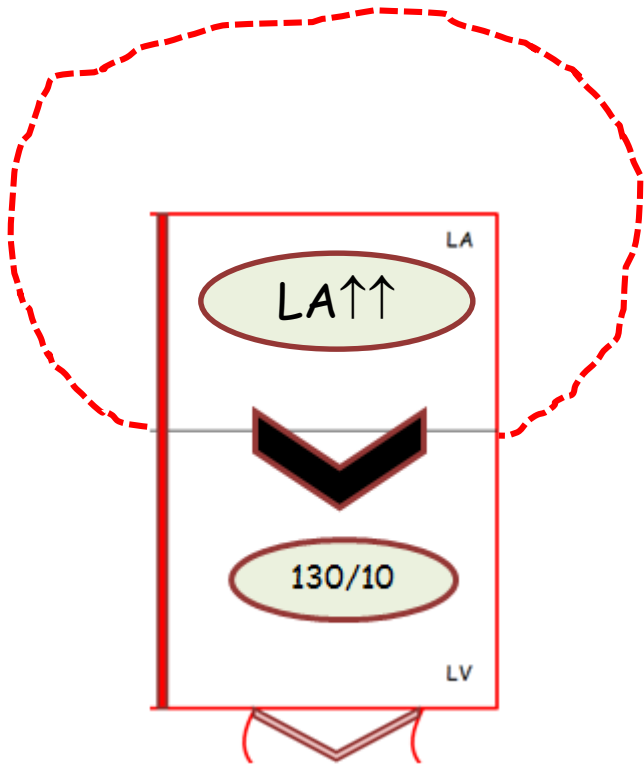
**ARF** causes pancarditis and valvular insufficiency (Ao or MV).

Repeated bouts of RF lead to late sequelae including valvular **stenosis**.

Rx: suppressive PCN x yrs

Special note: either **aortic or mitral** can become stenotic.

## Derivatives and Final Tidbits: Complications

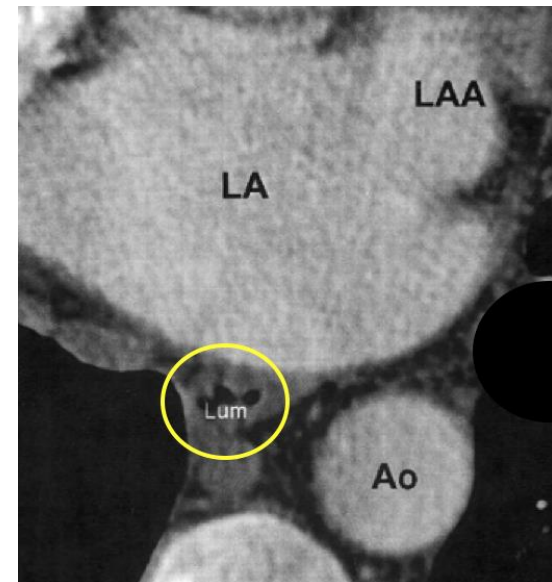
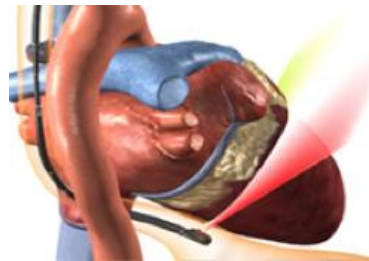
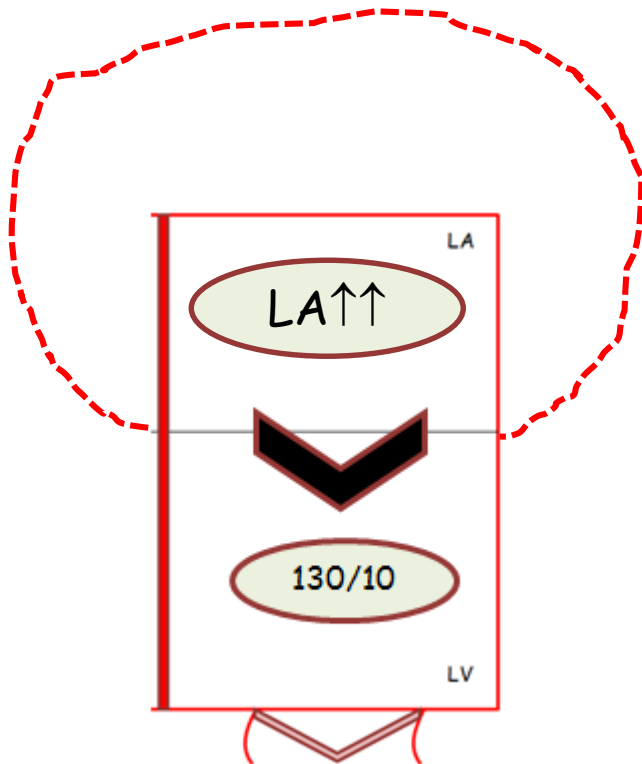


Compression of surrounding structures.  
Which structures are those?

## Derivatives and Final Tidbits: Complications

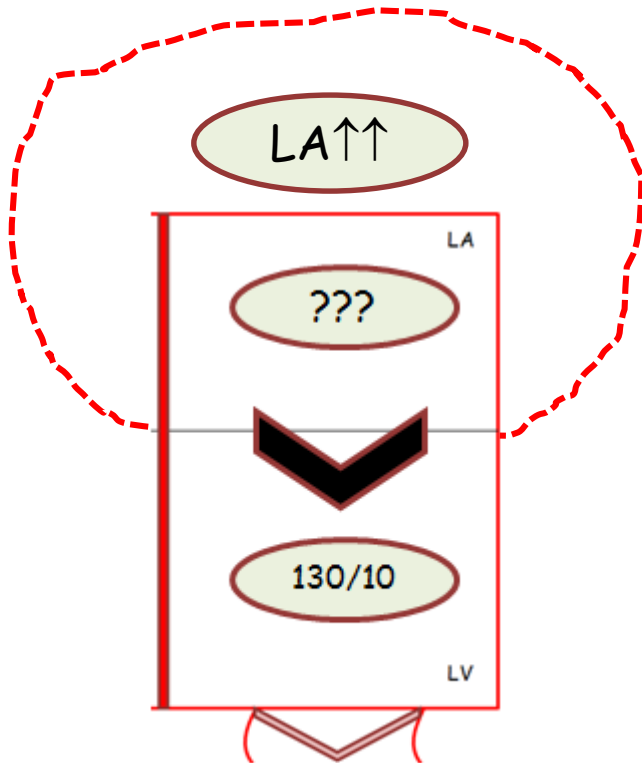
Compression of surrounding structures

Esophagus → dysphagia  
Laryngeal nerve → hoarseness





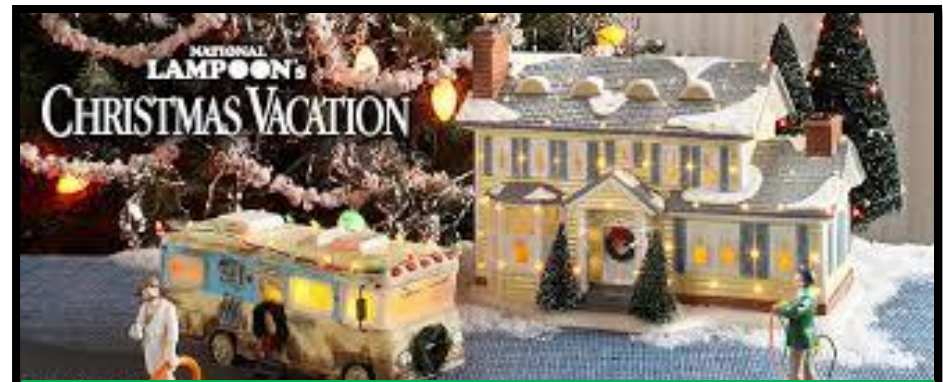
# Derivatives and Final Tidbits: Complications



Compression of surrounding structures

Esophagus: dysphagia  
Laryngeal nerve: hoarseness

Atrial fibrillation



This is just a small excursion...

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