RHEUMATIC FEVER & RHEUMATIC HEART DISEASE

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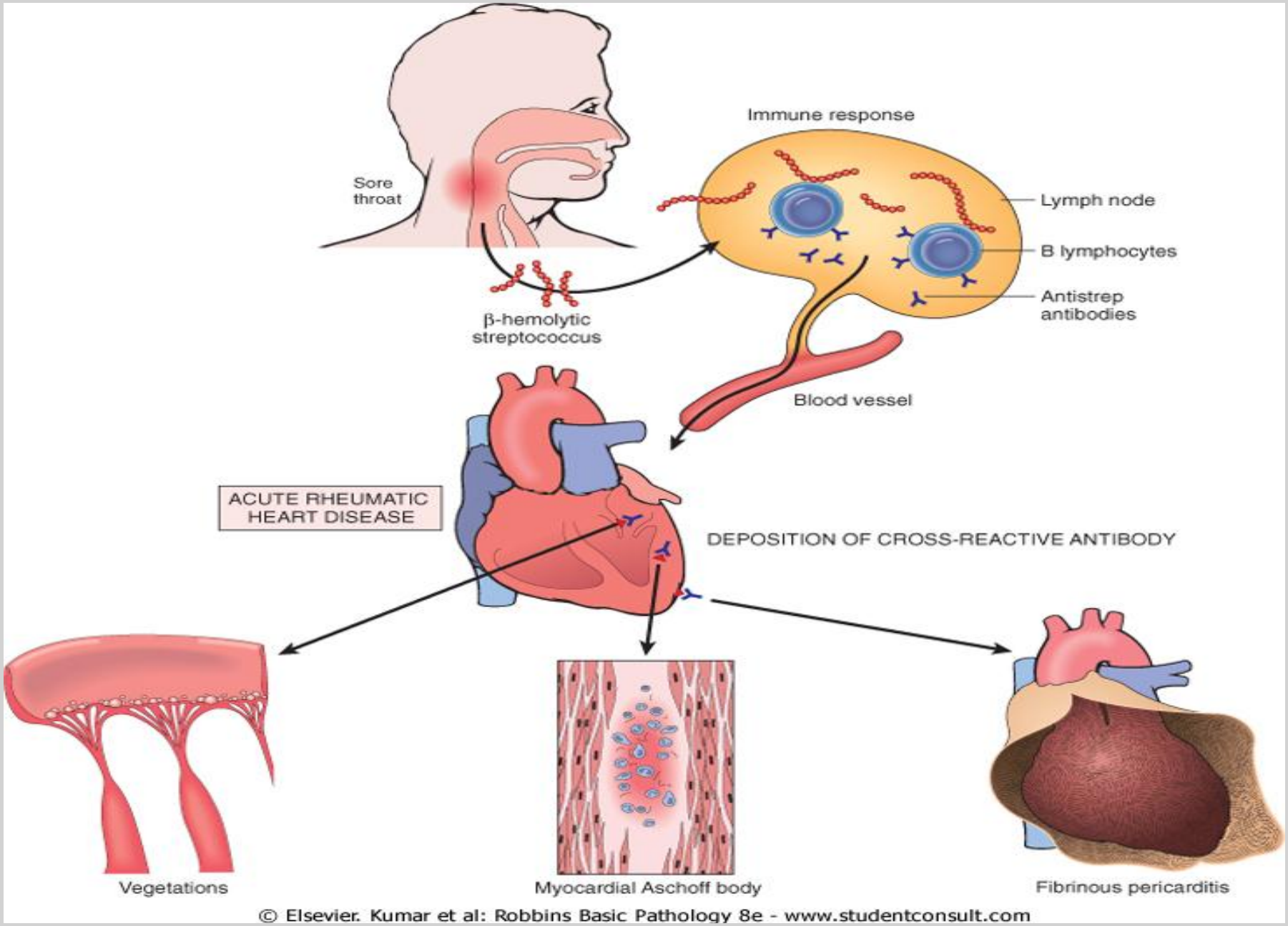
ACUTE RHEUMATIC FEVER

- **Autoimmune consequence** of infection (***pharyngeal infection not the skin infection***) with **Group A beta haemolytic streptococcal infection (GABHS)**
- Generalized **inflammatory response** affecting brains, joints, skin, subcutaneous tissues & the heart
- Modified **Duckett-Jones criteria** form the basis of the diagnosis of the condition


Sore throat
Immune response
Lymph node
B lymphocytes
Antistrep antibodies
β-hemolytic streptococcus
Blood vessel
ACUTE RHEUMATIC HEART DISEASE
DEPOSITION OF CROSS-REACTIVE ANTIBODY
Vegetations
Myocardial Aschoff body
Fibrinous pericarditis
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ACUTE RHEUMATIC FEVER

Supporting evidences:

- About 66% of the patients with an acute episode of rheumatic fever have a **history of an upper respiratory tract infection** several weeks before

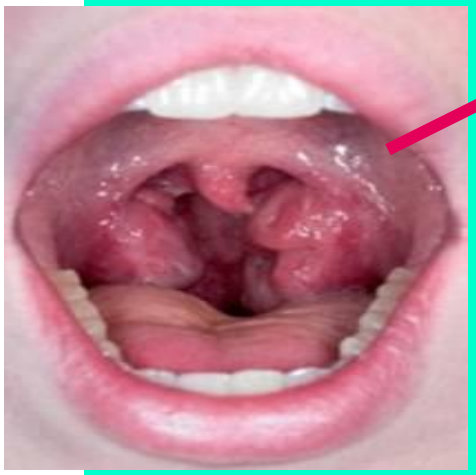
- The peak **age** (5-15 yrs) & **seasonal incidence** of acute rheumatic fever closely parallel those of GABHS infections

ACUTE RHEUMATIC FEVER

Features suggestive of GABHS infection

- Patient 5 to 15 years of age
- Presentation in winter or early spring
- Fever, Headache
- Sudden onset of sore throat
- Nausea, vomiting & abdominal pain; Pain with swallowing joints
- Beefy, swollen, red uvula
- Soft palate petechiae ("doughnut lesions")
- Tender, enlarged anterior cervical nodes
- Tonsillopharyngeal erythema & exudates

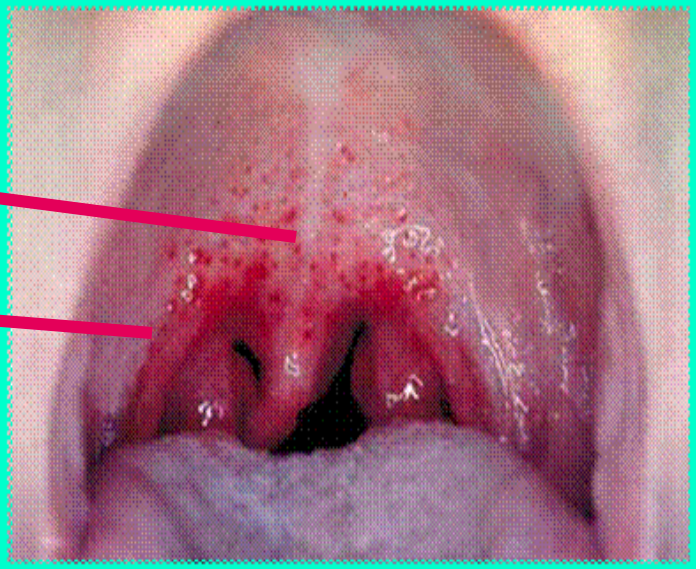
ACUTE RHEUMATIC FEVER

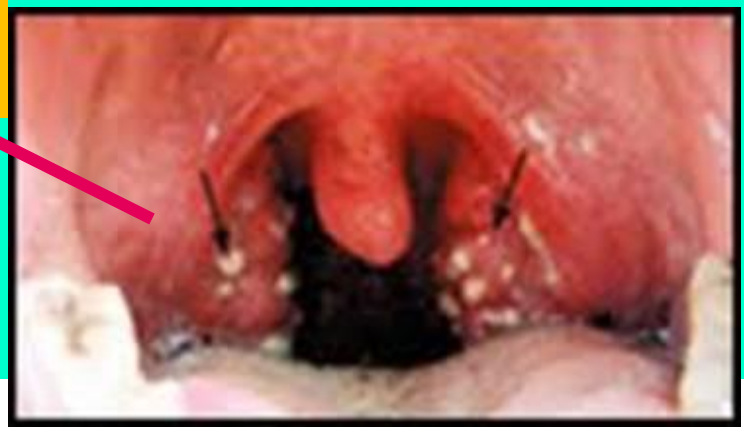


Redness & swelling of throat & tonsils;

Beefy, swollen, red uvula; Soft palate petechiae ("doughnut lesions")

Tonsillopharyngeal erythema & exudates





Sore throat: fever, white draining patches on the throat & swollen or tender lymph glands in the neck

ACUTE RHEUMATIC FEVER

Supporting evidences:

- Patients with acute rheumatic fever almost always have **serologic evidence** of a recent GABHS infection
- Their **antibody titers** are usually considerably **higher** than those in patients with GABHS infections **without** acute rheumatic fever
- Antimicrobial therapy against GABHS: prevents initial episodes of acute rheumatic fever &
- Long-term, continuous prophylaxis: prevents recurrences of acute rheumatic fever

ACUTE RHEUMATIC FEVER

Predisposing factors:

- Family history of rheumatic fever
- Low socioeconomic status (poverty, poor hygiene, medical deprivation)
- Age: 5-15 years

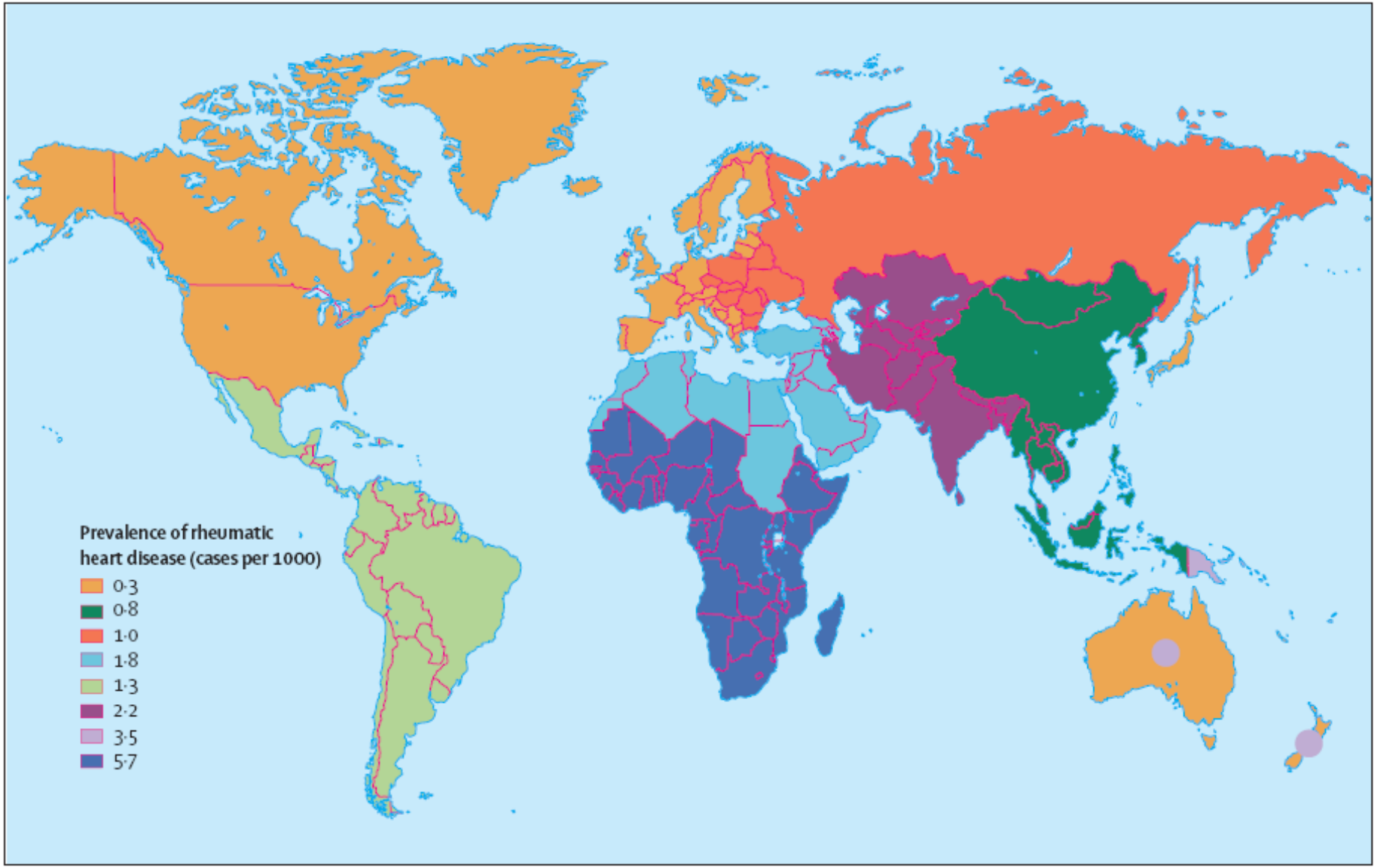


Figure 1: **Prevalence of rheumatic heart disease in children aged 5–14 years**
The circles within Australia and New Zealand represent indigenous populations (and also Pacific Islanders in New Zealand).

CLINICAL MANIFESTATIONS

- No pathognomonic clinical or laboratory finding for acute rheumatic fever
- Duckett Jones in 1944 proposed guidelines to aid in diagnosis & to limit overdiagnosis
- Jones criteria for the diagnosis of acute rheumatic fever **2 major criteria or 1 major & 2 minor criteria along with the absolute requirement**
- There are **5 major** and **4 minor** criteria & **an absolute requirement** for evidence (microbiologic or serologic) of recent GABHS infection

DIAGNOSIS

MAJOR MANIFESTATIONS	MINOR MANIFESTATIONS	SUPPORTING EVIDENCE OF ANTECEDENT GROUP A STREPTOCOCCAL INFECTION******
Carditis	Clinical features: Arthralgia Fever	-Elevated or increasing streptococcal antibody titer
Polyarthritis	Laboratory features: Elevated acute phase reactants: ESR, C-reactive protein Prolonged PR interval	**History of (<45 days)** -Positive throat culture or rapid streptococcal antigen test or streptococcal sore throat or scarlet fever)
Erythema marginatum		
Subcutaneous nodules		
Chorea		

MAJOR MANIFESTATIONS

Migratory Polyarthritis

- Most common (75%)
- Involves **larger** joints: the knees, ankles, wrists & elbows
- Rheumatic joints: hot, red, swollen & exquisitely tender (friction of bedclothes is uncomfortable)
- The **pain** can precede & can appear to be disproportionate to the other findings

Migratory Polyarthritis

- The joint involvement is characteristically migratory in nature
- Monoarticular arthritis is unusual unless anti inflammatory therapy is initiated prematurely, aborting the progression of the migratory polyarthritis

Migratory Polyarthritis

- If a child with fever and arthritis is suspected of having acute rheumatic fever: **withhold** salicylates & observe for migratory progression
- **A dramatic response to even small doses of salicylates is another characteristic feature of the arthritis**
- Rheumatic arthritis is typically not deforming

Migratory Polyarthritis

- Arthritis; earliest manifestation of acute rheumatic fever
- Correlate temporally with peak antistreptococcal antibody titers
- **An inverse relationship between the severity of arthritis & the severity of cardiac involvement**

Carditis

- Carditis & chronic rheumatic heart disease: **most serious manifestations** of acute rheumatic fever
- Account for essentially all of the associated morbidity and mortality
- Occurs in 50% of patients
- Rheumatic carditis: **pancarditis** with active inflammation of myocardium, pericardium & endocardium
- **Acute rheumatic carditis:** tachycardia out of proportion to fever & cardiac murmurs, with or without evidence of myocardial or pericardial involvement

Carditis

- Consists of either isolated mitral valvular disease or combined aortic & mitral valvular disease
- Valvular insufficiency: characteristic of both acute & convalescent stages of acute rheumatic fever
- Mitral regurgitation: a high-pitched apical holosystolic murmur radiating to the axilla
- In patients with significant mitral regurgitation- associated with an apical mid-diastolic murmur of relative mitral stenosis
- Aortic insufficiency: a high-pitched decrescendo diastolic murmur at the upper left sternal border

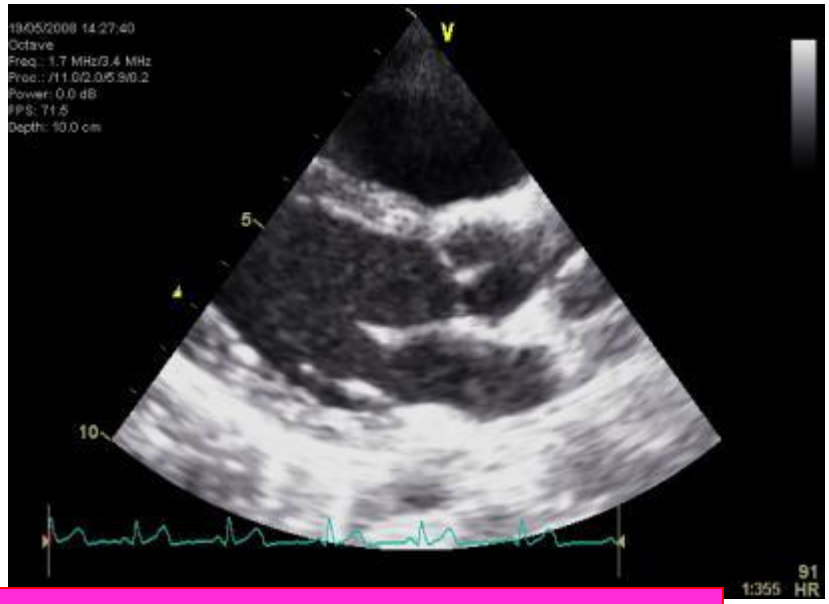
Carditis

- Valvular stenosis: appears several years or even decades after the acute illness
- However, in developing countries where acute rheumatic fever often occurs at a earlier age, mitral stenosis & aortic stenosis may develop in young children
- **Moderate to severe rheumatic carditis:** cardiomegaly & congestive heart failure with hepatomegaly & peripheral & pulmonary edema
- Myocarditis &/or pericarditis **without evidence** of endocarditis: rarely due to rheumatic heart disease

Carditis

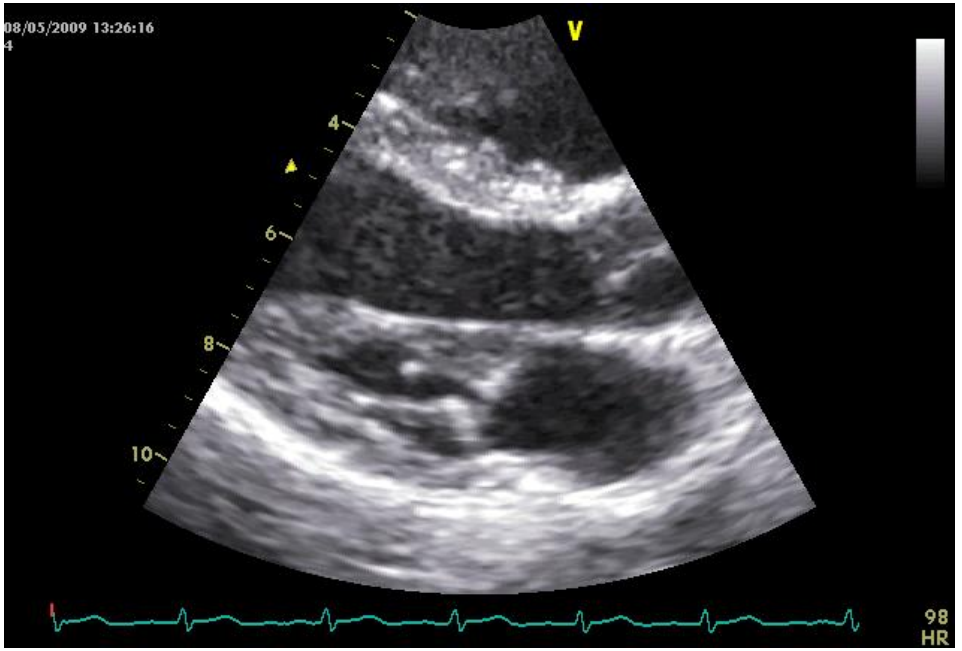
- **Echocardiographic findings:** pericardial effusion, decreased ventricular contractility & aortic &/or mitral regurgitation

- **The major consequence of acute rheumatic carditis is chronic, progressive valvular disease**



During an episode of ARF, valve changes can be minor and are still able to regress

After recurrent episodes of ARF, thickening of subvalvar apparatus, chordal thickening and shortening and progression to permanent valve damage is evident



Chorea

- Sydenham chorea: 10-15% of patients with acute rheumatic fever
- Often in prepubertal girls (8-12 yrs)
- A long latency period (1-6 mo) between streptococcal pharyngitis & the onset of chorea
- Neuropsychiatric disorder
- Neurologic signs: choreic movement & hypotonia
- Psychiatric signs: emotional liability, hyperactivity, separation anxiety, obsessions & compulsions

Chorea

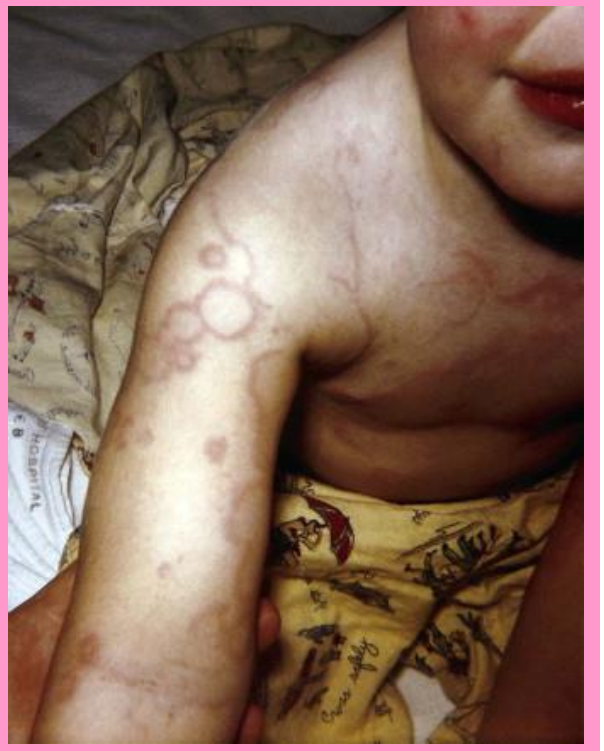
- Begins with emotional liability & personality changes (poor school performance)
- Replace in 1-4 weeks by characteristic spontaneous, purposeless movement of chorea (lasts 4-8 months) followed by motor weakness
- Exacerbation by stress & disappearing with sleep are characteristic
- Elevated titers of "antineuronal antibodies" against basal ganglion tissues have been found in over 90% of patients

Chorea

- Diagnosis: based on clinical findings with supportive evidence of **GABHS antibodies**
- In patients with a long latent period: antibody levels may have declined to normal
- SUBCLINICAL CARDITIS-30%
- Although the acute illness is distressing, chorea rarely, if ever, leads to permanent neurologic sequelae

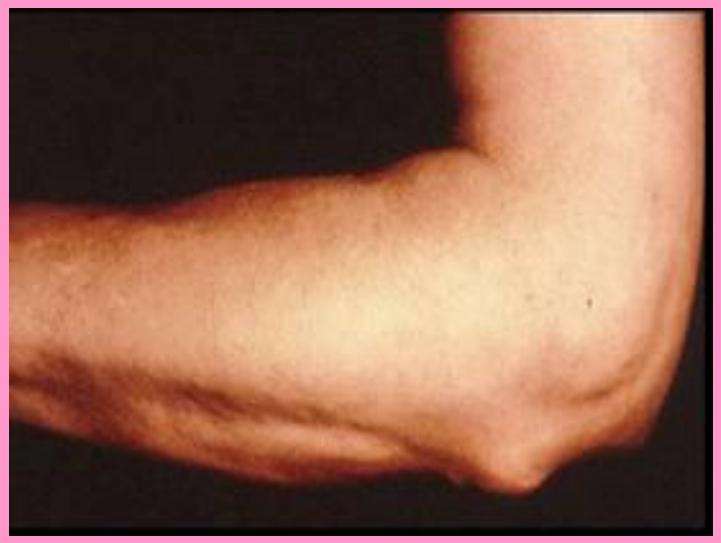
Erythema Marginatum

- A rare (**<3%** of patients with acute rheumatic fever) but characteristic rash of acute rheumatic fever
- It consists of **erythematous, serpiginous**, **macular** lesions with **pale centers** that are **not pruritic**
- It occurs primarily on the **trunk & extremities**, **not on** the face & it <u>can be accentuated by warming the skin</u>



Subcutaneous Nodules

- A rare (**≤1%** of patients with acute rheumatic fever) finding
- Consist of firm nodules approximately 1 cm in diameter along the extensor surfaces of tendons near bony prominences
- **A correlation between the presence of these nodules & significant rheumatic heart disease**



MINOR MANIFESTATIONS

MINOR MANIFESTATIONS

Clinical:

- 1. Arthralgia (**in the absence** of polyarthritis as a major criterion)
- 2. Fever (typically temperature ≥102°F & occurring early in the course of illness)

Laboratory minor manifestations:

- 1.Elevated acute-phase reactants (C-reactive protein, erythrocyte sedimentation rate, polymorphonuclear leukocytosis)
- 2. Prolonged PR interval on electrocardiogram (1st degree heart block)

ESSENTIAL CRITERIA

An absolute requirement for the diagnosis of acute rheumatic fever is supporting evidence of a recent GABHS infection

Recent Group A Streptococcus infection

- **Hallmarks of GAS sore throat:**
- High fever, tender anterior cervical lymph nodes
- Close contact with infected person
- Strawberry tongue, petechiae on palate
- Excoriated nacres(crusted lesions) in infants
- Tonsillar exudates in older children
- Abdominal pain

GOLD STANDARD: POSITIVE THROAT CULTURE

Recent Group A Streptococcus infection

- Acute rheumatic fever typically develops 2-4 wk after an acute episode of GABHS pharyngitis at a time when clinical findings of pharyngitis are no longer present & only 10-20% of the throat culture or rapid streptococcal antigen test results are positive

- Therefore, evidence of an antecedent GABHS infection is usually based on elevated or increasing serum antistreptococcal antibody titers

Recent Group A Streptococcus infection

1. ASO titre:

- well standardized
- elevated in 80% of patients with ARF

TREATMENT

- **Bed rest**

- **Antibiotic Therapy:**
  - 10 days of orally administered **penicillin** or **erythromycin** or a single intramuscular injection of **benzathine penicillin** to eradicate GABHS from the upper respiratory tract
  - Afterwards, the patient should be started on long-term antibiotic prophylaxis

TREATMENT

- **Anti-inflammatory Therapy:**
- Anti-inflammatory agents (**salicylates, corticosteroids**) should be **withheld** if arthralgia or atypical arthritis is the only clinical manifestation of presumed acute rheumatic fever
- Acetaminophen can be used
- **Patients with typical migratory polyarthritis & with carditis without cardiomegaly or congestive heart failure:**

  treatment with oral **salicylates**, 100 mg/kg/day in 4 divided doses PO **for 3-5 days**, followed by 75 mg/kg/day in 4 divided doses PO for **4-8 wk**

TREATMENT

- **Patients with carditis & cardiomegaly or congestive heart failure:**
- treatment with **corticosteroids**
- **Prednisone** 2 mg/kg/day in 4 divided doses for **2-6 wk** followed by a tapering of the dose that reduces the dose by 5 mg/24 hr every 2-3 days. At the beginning of the tapering of the prednisone dose, **aspirin** should be started at 75 mg/kg/day in 4 divided doses **to complete 12 wk of therapy**

TREATMENT

- Supportive therapies for patients with moderate to severe carditis include digoxin, fluid & salt restriction, diuretics & oxygen
- The cardiac toxicity of digoxin is enhanced with myocarditis

TREATMENT

Sydenham Chorea

- Occurs after the resolution of the acute phase of the disease
- Anti-inflammatory agents are **usually not** indicated
- Sedatives: **phenobarbital** (16-32 mg every 6-8 hr PO) is the drug of choice
- If phenobarbital is ineffective, then **haloperidol** (0.01-0.03 mg/kg/24 hr divided bid PO) or **chlorpromazine** (0.5 mg/kg every 4-6 hr PO) should be initiated
- Long-term antibiotic prophylaxis

PREVENTION

PREVENTION

PRIMARY-10 days course of penicillin therapy; about 30% of patients with acute rheumatic fever do not recall a preceding episode of pharyngitis

SECONDARY-Secondary prevention is directed at preventing acute GABHS pharyngitis in patients at substantial risk of recurrent acute rheumatic fever

SECONDARY PREVENTION

- **Who should receive prophylaxis?**

  Patients with documented history of rheumatic fever, including those with isolated chorea & those without evidence of rheumatic heart disease MUST receive prophylaxis

SECONDARY PREVENTION

- **For how long?**

CATEGORY	DURATION
Rheumatic fever without carditis	At least for 5 yr or until age 21 year, whichever is longer
Rheumatic fever with carditis but without residual heart disease (no valvular disease)	At least for 10 yr or well into adulthood, whichever is longer
Rheumatic fever with carditis & residual heart disease (persistent valvular disease)	At least 10 yr since last episode & at least until age 40 yr; sometime lifelong

SECONDARY PREVENTION

- What method of prophylaxis should be used?

DRUG	DOSE	ROUTE
Penicillin G benzathine	600,000 U for children, ≤27 kg 1.2 million U for children >27 kg, every 3 wk	Intramuscular
OR		
Penicillin V	250 mg, twice a day	Oral
OR		
Sulfadiazine or sulfisoxazole	0.5 g, once a day for patients ≤60 lb; 1.0 g, once a day for patients >60 lb	Oral
For people who are allergic to penicillin and sulfonamide drugs		
Macrolide or azalide	Variable	Oral

Thank you