Rheumatic fever. Rheumatic heart disease. Infectious endocarditis

Lecture
for third year dental faculty students
Rheumatic fever is an inflammatory disease which may develop after a Group A streptococcal infection (such as strept throat or scarlet fever, sometimes gum disease) and can involve the heart, joints, skin, and brain.

Acute rheumatic fever (ARF) is a complication of a strept throat caused by particular strains of GAS.
Two forms of RF

- 1. Acute RF
- 2. Rheumatic heart disease with Valvular damage:
Scarlet fever
Acute rheumatic fever

- Symptoms typically occur 18 days after an untreated strep throat. An acute attack lasts approximately 3 months.
Diagnosis: modified Jones criteria

Major criteria

- **Carditis**: inflammation of the heart muscle which can manifest as congestive heart failure with shortness of breath, pericarditis with a rub, or a new heart murmur.
- **Migratory polyarthritis**: a temporary migrating inflammation of the large joints, usually starting in the legs and migrating upwards.
- **Sydenham's chorea (St. Vitus' dance)**: a characteristic series of rapid movements without purpose of the face and arms. This can occur very late in the disease.
- **Erythema marginatum**: a long lasting rash that begins on the trunk or arms as macules and spread outward to form a snakelike ring while clearing in the middle. This rash never starts on the face and is made worse with heat.
- **Subcutaneous nodules (a form of Aschoff bodies)**: painless, firm collections of collagen fibers on the back of the wrist, the outside elbow, and the front of the knees. These now occur infrequently.
Migratory polyarthritis: a temporary migrating inflammation of the large joints, usually starting in the legs and migrating upwards

The most common clinical finding is a migratory arthritis involving multiple joints.
Carditis: inflammation of the heart muscle which can manifest as congestive heart failure with shortness of breath, pericarditis with a rub, or a new heart murmur and arrhythmias of heart rate.

- The most serious complication is carditis, or heart inflammation (rheumatic heart disease), as this may lead to chronic heart disease and disability or death years after an attack.
Heart failure

- Some patients develop significant carditis which manifests as congestive heart failure signs: dyspnoe, tachicardia, cyanosis. This requires the usual treatment for heart failure: diuretics, digoxin, et cetera. Unlike CHD heart failure, rheumatic heart failure responds well to corticosteroids.
“When I yell ‘CLEAR’ that doesn’t mean you.”
Dyspnea: tachypnea, orthopnea, cardiac asthma, lung edema
Cyanosis
Tachicardia
Edema
Liver enlargement, cýrrhosis
Sydenham's chorea (St. Vitus' dance): a characteristic series of rapid movements without purpose of the face and arms. This can occur very late in the disease.

- A neurological disorder, Sydenham's chorea (St. Vitus' dance), can occur months after an initial attack, causing jerky involuntary movements, muscle weakness, slurred speech, and personality changes.
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Diagnosis: modified Jones criteria

Minor criteria

- **Fever**: temperature elevation
- **Arthralgia**: Joint pain without swelling
- **Laboratory abnormalities**: increased Erythrocyte sedimentation rate, increased **C reactive protein**, **leukocytosis**
- **Electrocardiogram abnormalities**: a prolonged PR interval
- **Evidence of Group A Strep infection**: positive culture for Group A Strep, elevated or rising **Antistreptolysin O titre**
- **Previous rheumatic fever or inactive heart disease**
A-V blockade
Treatment

- Reduction of inflammation with anti-inflammatory medications such as aspirin or corticosteroids. Individuals with positive cultures for strep throat should also be treated with antibiotics. Another important cornerstone in treating rheumatic fever includes the continuous use of low dose antibiotics (such as penicillin, sulfadiazine, or erythromycin) to prevent recurrence.
Prevention

- Initial episodes of ARF as well as recurrences can be prevented by treatment of strep throat with appropriate antibiotics.
INFECTIVE ENDOCARDITIS

- Infective endocarditis (IE) is an infection of the endocardial surface of the heart.
INFECTIVE ENDOCARDITIS

- The intracardiac effects of this infection include severe valvular insufficiency, which may lead to intractable congestive heart failure and myocardial abscesses.
INFECTIVE ENDOCARDITIS

Figure 2. Left Eye. Reveals a small quantity of fibrin and hemorrhagic areas in the anterior chamber

Mitral Valve Vegetation
(Courtesy of Vance G. Fowler, Jr., MD
Duke University Medical Center
Durham, NC)
Most subacute disease caused by *S viridans* infection is related to dental disease. However, most cases are not caused by dental procedures but by transient bacteremias caused by gingivitis. In 85% of patients, symptoms of endocarditis appear within 2 weeks of dental or other procedures.
Infective endocarditis

- Fever (often spiking)
- Continuous presence of micro-organisms in the bloodstream determined by serial collection of blood cultures
- Vegetations on valves on echocardiography, which sometimes can cause a new or changing heart murmur, particularly murmurs suggestive of valvular regurgitation
- Vascular phenomena: Septic emboli (causing circulatory problems such as stroke or gangrene of fingers), Janeway lesions (painless hemorrhagic cutaneous lesions on the palms and soles), intracranial hemorrhage, conjunctival hemorrhage, splinter hemorrhages
- Immunologic phenomena: Glomerulonephritis, Osler's nodes (painful subcutaneous lesions in the distal fingers), Roth spots on the retina, positive serum rheumatoid factor
Acute IE is an aggressive disease.

The patient notices an acute onset of high-grade fevers and chills and a rapid onset of congestive heart failure.

Again, a history of antecedent procedures or illicit drug use must be investigated.
Low-grade fever (absent in 3-15% of patients), anorexia, weight loss, influenzalike syndromes, polymyalgialike syndromes, pleuritic pain, syndromes similar to rheumatic fever (eg, fever, dulled sensorium as in typhoid, headaches), and abdominal symptoms (eg, right upper quadrant pain, vomiting, postprandial distress, appendicitislike symptoms).
IE septicopieemia

- Continuous presence of micro-organisms in the bloodstream determined by serial collection of blood cultures
Vegetations on valves

- Vegetations on valves on echocardiography, which sometimes can cause a new or changing heart murmur, particularly murmurs suggestive of valvular regurgitation
Vascular phenomena

- Septic emboli (causing circulatory problems such as stroke or gangrene of fingers), Janeway lesions (painless hemorrhagic cutaneous lesions on the palms and soles), intracranial hemorrhage, conjunctival hemorrhage, splinter hemorrhages
Immunologic phenomena

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Emboli by IE

- Signs and symptoms secondary to emboli include acute meningitis with sterile spinal fluid, hemiplegia in the distribution of the middle cerebral artery,
- regional infarcts that cause painless hematuria, infarction of the kidney or spleen, unilateral blindness caused by occlusion of a retinal artery, and myocardial infarction due to embolization of a coronary artery.
- The emboli of right-sided IE commonly produce pulmonary infarcts.
Valvular heart disease

- VHD is any disease process involving one or more valves of the heart. The valves in the right side of the heart are the tricuspid valve and the pulmonic valve. The valves in the left side of the heart are the mitral valve and the aortic valve.
Aortic insufficiency (AI), also known as aortic regurgitation (AR),

- is the leaking of the aortic valve of the heart that causes blood to flow in the reverse direction during ventricular diastole, from the aorta into the left ventricle.
Aortic insufficiency
Diastolic murmur

- large-volume, 'collapsing' pulse
- bounding peripheral pulses; also known as **Watson's water hammer pulse**
- low **diastolic** and increased pulse pressure
- **Corrigan's pulse** (rapid upstroke and collapse of the **carotid artery** pulse)
- **de Musset's sign** (head nodding in time with the heart beat)
- **Quincke's sign** (pulsation of the capillary bed in the nail)
- **Duroziez's sign** (systolic and diastolic murmurs described as 'pistol shots' heard over the femoral artery when it is gradually compressed)
- **Traube's sign** (a double sound heard over the femoral artery when it is compressed distally)
Aortic valve stenosis (AS)

- is a heart condition caused by the incomplete opening of the aortic valve.
- The aortic valve controls the direction of blood flow from the left ventricle to the aorta.
Aortic valve stenosis

- Systolic rhomb like murmur
- Left ventricular hypertrophies
Mitral regurgitation (MR), also known as mitral insufficiency, is the abnormal leaking of blood through the mitral valve, from the left ventricle into the left atrium of the heart.
Mitral regurgitation (MR)
Mitral stenosis
Mitral stenosis
Mitral stenosis

- Diastolic murmur on the heart apex