**COMMUNITY MEDICINE**

EPIDEMIOLOGY OF STREPTOCOCCAL DISEASES

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**1. Identification**—Group A streptococci cause a variety of diseases. The most frequently encountered conditions are:

1. streptococcal pharyngitis /tonsillitis (sore throat)
2. Streptococcal skin infections (impetigo or pyoderma).
3. Scarlet fever
4. puerperal fever
5. Others Septicemia, erysipelas, cellulites, mastoiditis, otitis media, pneumonia, peritonsillitis, wound infections
6. Necrotizing fasciitis, rheumatic fever and a toxic shock-like syndrome. One or other form of clinical disease often predominates during outbreaks.

**Streptococcal sore throat**

* Patients with streptococcal sore throat typically exhibit sudden onset of fever, exudative tonsillitis or pharyngitis (sore throat), with tender, enlarged anterior cervical lymph nodes.
* The pharynx, the tonsillar pillars and soft palate may be injected and oedematous; petechiae may be present against a background of diffuse redness.
* Coincident or subsequent otitis media or peritonsillar abscess may occur.
* As may acute glomerulonephritis (1–5 weeks, mean 10 days) or acute rheumatic fever (mean 19 days).
* Rheumatic heart (valvular) disease occurs days to weeks after acute streptococcal infection, Sydenham chorea several months following infection.

**Streptococcal skin infection (pyoderma, impetigo)**

* Is usually superficial and may proceed through vesicular, pustular and encrusted stages.
* Scarlatiniform rash is unusual and rheumatic fever is not a sequel.
* however, glomerulonephritis may occur later, usually 3 weeks after the

skin infection.

**Scarlet fever**

* Is a form of streptococcal disease characterized by a skin rash, occurring when the infecting strain produces a pyrogenic exotoxin (erythrogenic toxin) and the patient is sensitized but not immune to the toxin.
* Clinical characteristics may include all symptoms associated with a streptococcal sore throat (or with a streptococcal wound, skin or puerperal infection) as well as enanthem, strawberry tongue and exanthem.
* The rash is usually a fine erythema, commonly punctate, blanching on

pressure, often felt (like sandpaper) better than seen and appearing most

often on the neck, chest, folds of the axilla, elbow, groin and inner

surfaces of the thighs.

* Typically, the scarlet fever rash does not involve the face, but there is

flushing of the cheeks and circumoral pallor.

High fever, nausea and vomiting often accompany severe infections.

* During convalescence, desquamation of the skin occurs at the tips of fingers and toes, less often over wide areas of trunk and limbs, including palms and soles; it is more pronounced where the exanthem was severe.
* The case-fatality rate in some parts of the world has occasionally been as high as 3%. Scarlet fever may be followed by the same sequelae as streptococcal sore throat.

**Erysipelas**

* Is an acute cellulitis characterized by fever, constitutional symptoms, leukocytosis and a red, tender, oedematous spreading lesion of the skin, often with a definite raised border?
* The central point of origin tends to clear as the periphery extends.
* Face and legs are common sites.
* Recurrences are frequent.
* The disease is more common in women and may be especially severe, with bacteraemia, in patients suffering from debilitating disease.
* Case-fatality rates vary depending on the part of the body affected and whether there is an associated disease.
* Erysipelas due to group A streptococci is to be distinguished from erysipeloid caused by *Erysipelothrix rhusiopathiae*, a localized cutaneous infection seen primarily as an occupational disease of people handling freshwater fish or
* shellfish, infected swine or turkeys or their tissues or, rarely, sheep, cattle,

chickens or pheasants.

**Streptococcal puerperal fever**

* is an acute disease, usually febrile, with local and general symptoms/signs of bacterial invasion of the genital tract and sometimes the bloodstream in the postpartum or postabortion patient.
* Case-fatality rate is low when streptococcal puerperal fever is adequately
* treated. Puerperal infections may be caused by organisms other than hemolytic streptococci.
* they are clinically similar but differ bacteriologically and epidemiologically (See Staphylococcal disease).
* Predominant clinical features include hypotension and any of the following: renal
* impairment; thrombocytopenia; disseminated intravascular coagulation

(DIC); SGOT or bilirubin elevation; adult respiratory distress syndrome; a

* generalized erythematous macular rash or soft-tissue necrosis (necrotizing

fasciitis).

* TSS may occur with either systemic or focal (throat, skin, lung sites) group A streptococcal infections.
* Streptococci of other groups can produce infections in humans.
* Betahemolytic organisms of group B found in the human vagina may cause

neonatal sepsis and suppurative meningitis (see Group B streptococcal

disease of the newborn), as well as urinary tract infections, postpartum

endometritis and other systemic disease in adults, especially those with

diabetes mellitus. Group D organisms (including enterococci), hemolytic

or nonhemolytic, are involved in bacterial endocarditis and urinary tract

infections.

* Groups C and G have produced outbreaks of streptococcal tonsillitis, usually foodborne; their role in sporadic cases is less welldefined.
* Glomerulonephritis has followed group C infections, but has very rarely been reported after group G infection; neither group causes rheumatic fever. Group C and G infections are more common in adolescents and young adults. Alpha-hemolytic streptococci are also a common cause of bacterial endocarditis.
* Provisional laboratory findings for group A streptococcal disease are based on the isolation of the organisms from affected tissues on blood agar or other appropriate media, or on identification of group A streptococcal antigen in pharyngeal secretions (the rapid antigen detection test).
* The current recommended practice is to first do a rapid antigen detection test (high specificity but low sensitivity) and, if this is positive, assume the patient has a group A streptococcal infection. If the
* result is negative or equivocal, a throat culture should be done to guide
* management and prevent superfluous antibiotherapy.

**2. Infectious agent**—

* *Streptococcus pyogenes*, group A streptococci of over 130 serologically distinct types that vary by geographic and time distributions.

**3. Occurrence**—

* Streptococcal pharyngitis/tonsillitis and scarlet fever are common in temperate zones, well recognized in semitropical areas and less frequently recognized in tropical climates.
* Before the age of 2–3, streptococcal infections may occur but streptococcal pharyngitis is unusual; this peaks in age group 6–12 and declines thereafter.
* Cases occur year round but peak in colder seasons.
* Rheumatic fever remains a great health problem in the developing world. The highest incidence, during late winter and spring, corresponds to that of pharyngitis.
* Age group 3–15 is most often affected.
* The highest incidence of streptococcal impetigo occurs in young children in the latter part of the hot season in hot climates.
* Geographical and seasonal distribution of erysipelas are similar to those for scarlet fever and streptococcal sore throat.
* erysipelas is most common in infants and those over 20.

**4. Reservoir**—Humans.

**5. Mode of transmission**—

* Large respiratory droplets or direct contact with patients or carriers, rarely indirect contact through objects.
* Individuals with acute upper respiratory tract (especially nasal) infections are particularly likely to transmit infection.
* Anal, vaginal, skin and pharyngeal carriers have been responsible for nosocomial outbreaks of serious streptococcal infection, particularly following surgical procedures.
* Explosive outbreaks of streptococcal sore throat may follow ingestion of contaminated food.
* Milk and milk products have been associated most frequently with food borne outbreaks; egg salad and similar preparations have recently been implicated

**6. Incubation period**—Short, usually 1–3 days, rarely longer.

**7.Period of communicability**—

* In untreated, uncomplicated cases, 10–21 days;
* With adequate penicillin treatment, transmissibility generally ends within 24 hours.
* Patients with untreated streptococcal pharyngitis may carry the organism for weeks or months

**8. Susceptibility**—

* Susceptibility to streptococcal pharyngitis/tonsillitis and scarlet fever is general,

**9. Methods of control**—

***A. Preventive measures:***

1) Educate the public and health workers about modes of Transmission

2) Provide easily accessible laboratory facilities for recognition of group A hemolytic streptococci.

3) Pasteurize milk

4) Exclude people with skin lesions from food handling.

5) Secondary prevention of complications: To prevent streptococcal reinfection and possible recurrence of rheumatic fever, erysipelas or chorea, monthly injections of long-acting

benzathine penicillin G (or daily penicillin orally in compliant patients) should be given for at least 5 years. Those who do not tolerate penicillin may be given sulfisoxazole orally or

erythromycin if necessary.

**ACUTE RHEUMATIC FEVER**

* Autoimmune consequence of infection with Group A streptococcal infection
* Results in a generalised inflammatory response affecting brains, joints, skin, subcutaneous tissues and the heart.
* The clinical presentation can be vague and difficult to diagnose.
* Currently the modified Duckett-Jones criteria form the basis of the diagnosis of the condition.
* The prevalence of RF among children age 5-15 years in EMR, is 1%, which is similar to reported Prevalence in Africa, Asia & Latin America.
* In Yemen 60% of cardiac surgery is due to rheumatic heart complications.
* IN Egypt, 5-7% of cardiac surgery is due to rheumatic heart complications
* RF is a Preventable Disease

**The major Determinants of Rheumatic Fever and Rheumatic Heart Disease are**

* **poverty,**
* **malnutrition,**
* **overcrowding,**
* **poor housing**
* **shortage of health-care resources.**

**RF and RHD remain significant causes of cardiovascular diseases in the world today.**

**The most devastating effects are on children and young adults in their most productive years.**

* **If properly treated, 75% of people with rheumatic fever recover completely.**
* **The epidemiology of acute rheumatic fever is due to streptococcal sore throat.**
* **ARF most often occurs in children; the peak age-related incidence is between 5 and 15 years.**
* **3% of individuals with untreated group A streptococcal pharnygitis will develop RF.**
* **The concept of Rheumatogenecity of specific strains is largely used upon epidemiologic evidence associating certain serotypes with RF (serotype 1, 3, 5,6,18, etc.).**

**Diagnosis of RF:**

**Modified Jones criteria**

**Major criteria:**

* **Carditis**
* **Migratory polyarthritis**
* **Sydenham'chorea**
* **Subcutaneous nodules**
* **Erythema Marginatum**

**Minor criteria:**

**Clinical**

* **Fever**
* **Arthritis**

**Laboratory**

* **Elevated acute phase reactants**
* **Prolonged PR interval**

**Plus**

* **Supporting evidence of recent group A streptococcal infection (e.g., positive throat culture or rapid antigen detection test; and/or elevated or increasing streptococcal antibody test).**

**80% of patients with ARF have an elevated anti-streptolysin O titer at presentation.**

**Primary Prevention of Rheumatic Fever**

The primary prevention of rheumatic fever (RF) is defined as the adequate antibiotic therapy A

streptococcal upper respiratory tract (URT) infections to prevent an initial attack of acute RF

**The conventional treatment should be a complete course of ten days started either by oral penicillin V(500mg twice daily) or erythromycin 250mg four times daily for those of penicillin allergy.**

**Many still chose IM benzathine penicillin G (a single IM injection 1.2 million units). This will also serve as the first dose of secondary prophylaxis for prevention of recolonization of URT infection in the future.**

**Secondary prevention**

* Patients who have had an attack of rheumatic fever and develop subsequent GAS pharyngitis are at high risk for a recurrent attack of rheumatic fever, with progression in severity of rheumatic heart disease from the initial episode.

**WHO Secondary prophylaxis:**

* **IM of 1.2 Million units of benzathine penicillin every three-four weeks and for at least 5 years after the first attack.**

**Many believe that prophylaxis should be given for life if complicated by rheumatic heart disease.**

**Duration** —

* The total duration depends risk of recurrent rheumatic fever and severity of disease.
* The risk of recurrent rheumatic fever depends on several factors
1. The number of previous attacks
2. Time since the last attack
3. Risk of exposure to streptococcal infections
4. Patient age
5. Presence or absence of cardiac involvement