

Epidemiology Of Streptococcal Diseases 2023

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Objectives

- ☐ **TO KNOW THE DISEASES CAUSED BY STREPTOCOCCAL**
- ☐ **TO THROUGH LIGHT ON EPIDEMIOLOGY OF STREPTOCOCCAL AND ACUTE RHEUMATIC FEVER**
- ☐ **HAVE AN IDEA ABOUT PREVENTION**

Confirmed case

Laboratory confirmation of infection with or without clinical evidence of invasive disease.

Isolation of group A streptococcus (*Streptococcus pyogenes*) from a normally sterile site (blood, cerebrospinal fluid (CSF), pleural fluid, pericardial fluid, peritoneal fluid, deep tissue specimen taken during surgery .

Probable case

Clinical evidence of invasive disease in the absence of another identified etiology and with non-confirmatory laboratory evidence of infection:

- **Isolation of group A streptococcus from a non-sterile site OR**
- **positive group A streptococcus antigen detection.**

Clinical evidence of invasive disease

A. Streptococcal Toxic Shock Syndrome (STSS), which is characterized by hypotension (systolic blood pressure ≤ 90 mmHg in adults or < 5 th percentile for age for children) and at least two of the following signs:

- i. Renal impairment (creatinine level ≥ 2 mg/dl for adults).**
- ii. Coagulopathy (platelet count $\leq 100,000$ /mm or disseminated intravascular coagulation).**

iii. Liver function abnormality (SGOT [AST], SGPT [ALT], or total bilirubin \geq 2x upper limit of normal).

iv. Adult respiratory distress syndrome (ARDS).

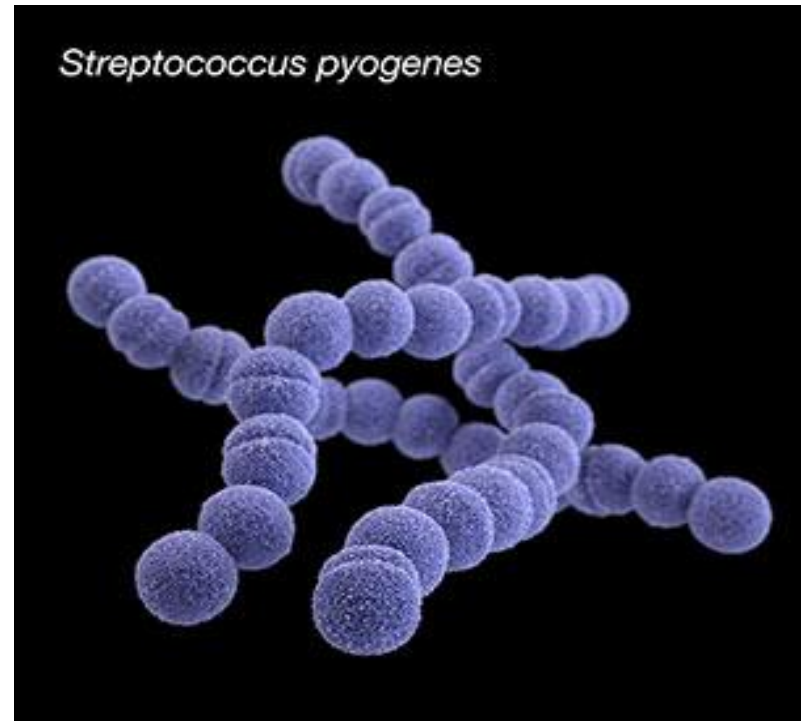
v. Generalized erythematous macular rash that may desquamate.

B. Soft-tissue necrosis, including necrotizing fasciitis, myositis or gangrene. c) Meningitis.

Epidemiology and Occurrence

Causative Agent :

**Group A
streptococcus –
Streptococcus
pyogenes, a gram-
positive coccus**



❑ Reservoir: Humans.

❑ Incubation Period :1-3 days

❑ Period of Communicability The specified period of infectivity of the index case is:

7 days prior to the onset of illness, until 24 hours after the start of treatment.

Mode of Transmission

- **Large respiratory droplets.**
- **Direct person to person contact with patient and or carrier.**

Risk Groups

1. Chronic conditions (HIV infection, cancer, heart disease, diabetes, lung disease);
2. Alcohol abuse;
3. Injection drug use;
4. Varicella.
5. Crowded living conditions and sub-optimal hygiene .
6. Immunosuppressive therapy
7. Elderly (65 years and older);
8. Systemic steroid .

Contact Definition/Categorization

Definition of Close Contacts

- Household contacts of a case who has spent at least 4 hours/day on average in the previous 7 days or 20 hours/week with the case.
- Non-household persons who share the same bed with the case or as STI
 - Persons who have had direct mucous membrane contact with the oral or nasal secretions.
- Injection drug users who have shared needles .

Streptococcal Pharyngitis

About 10% of adults with sore throat are infected with GAS=Group A streptococci

Among children with sore throat, the prevalence of GAS can be as high as 35%, with rates peaking from

5 to 15 years of age

Evaluation: consist of four findings

- (1) History of fever,**
- (2) Absence of cough**
- (3) Tender anterior cervical lymphadenopathy.**
- (4) Tonsillar exudate or swelling.**



RAPID STREP TESTS



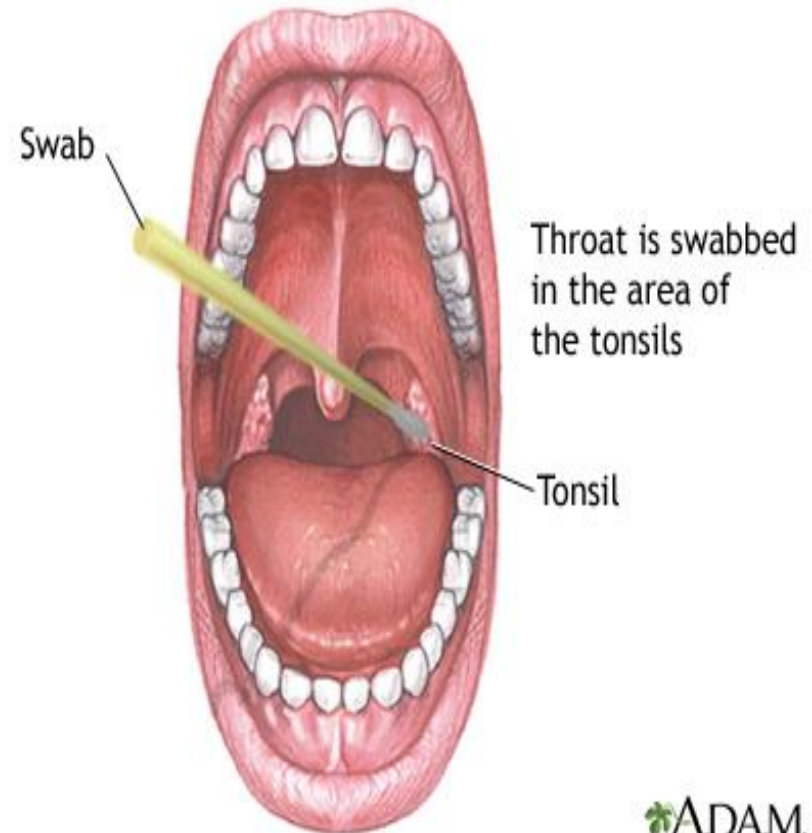
Rapid GAS-specific antigen tests have a sensitivity of ~80% and a specificity of ~95%.

Results are available within minutes and can be used to make therapeutic decisions before the patient leaves the office.

THROAT CULTURES

A single-swab throat culture has a sensitivity of ~85–90%, as defined by isolation of GAS on a second swab.

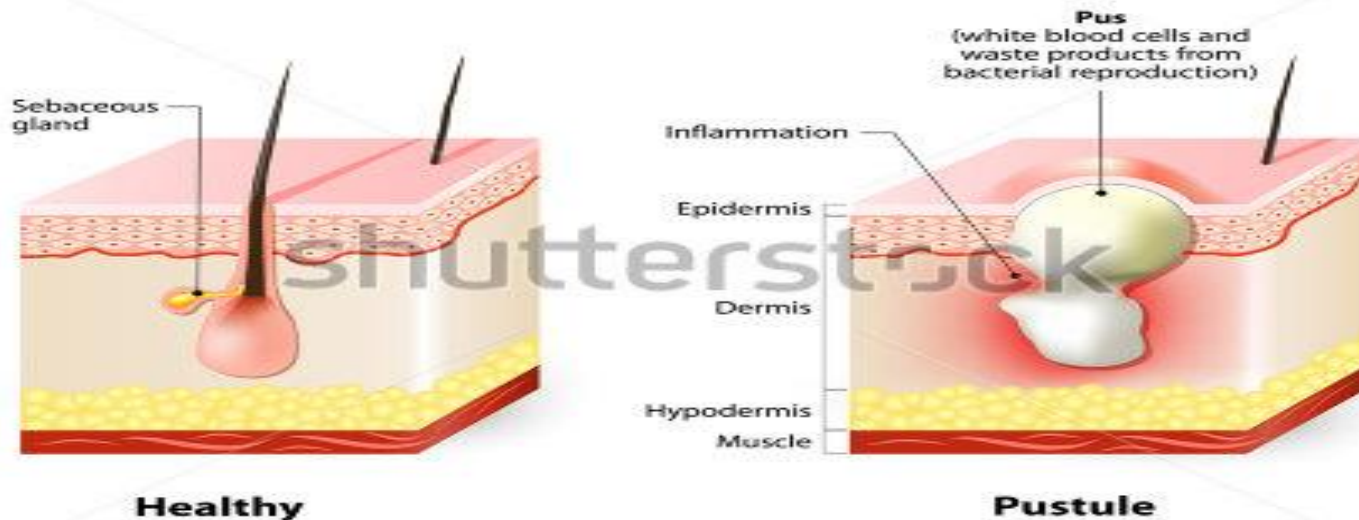
A throat culture can also be falsely positive for true infection





Streptococcal skin infection (pyoderma, impetigo)

Is usually superficial and may proceed through vesicular, pustule and encrusted stages.



Scarlatiniform rash is unusual and rheumatic fever is not a sequel.

however, glomerulonephritis(GN) may occur later, usually 3 weeks after the skin infection.





Scarlet fever

Clinical characteristics may include all symptoms associated with a streptococcal tonsillitis (or with wound, skin or infection) as well as enanthem, strawberry tongue and exanthema.

The rash arises from the effects of one of several toxins, currently Designated *streptococcal pyrogenic exotoxins* .

Typically, the scarlet fever rash does not involve the face,

There is flushing of the cheeks and circumoral pallor.

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.



STRAWBERRY TONGUE



Exanthema = skin rash + fever



DESEQUAMATION



All the followings are true regarding scarlet fever except:

- A. Typically, the face shows flushing of the cheeks and circumoral pallor.
- B. Is a form of streptococcal disease characterized by a skin rash
- C. The case-fatality rate in some parts of the world has occasionally been as high as 3%.
- D. Not followed by the sequelae as streptococcal sore throat.

Occurrence—

common in:

temperate zones.

semitropical

less frequently in tropical climates.

Before the age of 2–3, streptococcal infections may occur but tonsillitis is unusual.

this peaks in age group 5-15.

Mode of transmission

Direct contact with patients or carriers.

skin and pharyngeal carriers have been responsible for nosocomial outbreaks of serious streptococcal infection.

Milk and milk products have been associated most frequently with food borne outbreaks

Egg salad have recently been implicated

7. Period of communicability

In untreated, uncomplicated cases, 10–21 days.

With adequate penicillin treatment, transmissibility generally ends within 1 day

Patients with untreated streptococcal pharyngitis may shed the organism for weeks or months

ACUTE RHEUMATIC FEVER



Acute rheumatic fever (ARF)

A multisystem disease resulting from an autoimmune reaction to infection with GAS.

Although many parts of the body may be affected, almost all of the manifestations resolve completely.

The major exception is cardiac valvular damage (rheumatic heart disease [RHD]), which may persist after the other features have disappeared.

HOST FACTORS

Based on epidemiologic evidence, ~3–6% of any population may be susceptible to ARF.

Susceptibility to ARF is an inherited characteristic, with 44% concordance in monozygotic twins compared to 12% in dizygotic twins and heritability more recently estimated at 60%.

Some human leukocyte antigen (HLA) class II alleles, particularly HLA-DR7 and HLA-DR4, appear to be associated with susceptibility.

EPIDEMIOLOGY

ARF is mainly a disease of children age 5–14 years.

Initial episodes become less common in older adolescents and young adults and are rare in persons aged >30 years.

By contrast, recurrent episodes of ARF remain relatively common in adolescents and young adults.

This pattern contrasts with the prevalence of RHD, which peaks between 25 and 40 years.

There is no clear gender association for ARF, but RHD more commonly affects females, sometimes up to twice as frequently as males.

Study in Iraq

Rheumatic heart disease had started to decline a few decades ago, but a study of 784 cases of rheumatic fever registered in 15 health centers in Baghdad from 1991-1996 reported an increase in cases in recent years

Diagnosis of RF:

Modified Jones criteria

MAJOR CRITERIA:

- Carditis
- Migratory polyarthrititis
- Sydenham's chorea
- Subcutaneous nodules
- Erythema Marginatum

MINOR CRITERIA:

- Clinical
- Fever
- Arthritis

Laboratory

Elevated acute phase protein

Prolonged PR interval=

1st degree heart block

First degree heart block



Plus

Evidence of recent group A streptococcal infection :

- A. positive culture**
- B. Rapid antigen detection test.**
- C. Elevated or increasing streptococcal antibody test.**

Erythema marginatum





Subcutaneous nodules



Sydenham's Chorea



80% of patients with ARF have an elevated anti- Streptolysin O titer (ASOT) at presentation.

Normal value less than 200 Todds unit

All the following considered as major criteria in diagnosis of RF except:

- A. Carditis**
- B. Sydenham's chorea**
- C. Elevated ASOT**
- D. Subcutaneous nodules**
- E. Erythema Marginatum**

PREVENTION

PREVENTION

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graph TD; A[PREVENTION] --> B[PRIMARY-10 days course of penicillin therapy; about 30% of patients with acute rheumatic fever do not recall a preceding episode of pharyngitis]; A --> C[SECONDARY-Secondary prevention is directed at preventing acute GABHS pharyngitis in patients at substantial risk of recurrent acute rheumatic fever];
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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

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

Primary prevention is administered only when there is group A streptococcal URT infection.

SECONDARY PREVENTION

The mainstay of controlling ARF and RHD is secondary prevention.

Because patients with ARF are at dramatically higher risk than the general population of developing a further episode of ARF after a group.

A streptococcal infection, they should receive long-term penicillin prophylaxis to prevent recurrences.

The best antibiotic for secondary prophylaxis is benzathine penicillin G (1.2 million units, or 600,000 units if ≤ 27 kg) delivered every 4 weeks.

It can be given every 3 weeks, or even every 2 weeks, to persons considered to be at particularly high risk, although in settings where good compliance with an every- 4-week dosing schedule can be achieved, more frequent dosing is rarely needed.


Oral penicillin V (250 mg) can be given twice daily instead but is less effective than benzathine penicillin G. Penicillin-allergic patients can receive erythromycin (250 mg) twice daily.

The duration of secondary prophylaxis is determined by many factors:

The duration :since the last episode of ARF (recurrences become less likely with increasing time)

Age :(recurrences are less likely with increasing age).

The severity of RHD: (if severe, it is best to avoid even a very small risk of recurrence because of the potentially serious consequences) .




NDC 0143-9836-01

Penicillin V Potassium Tablets, USP


500 mg (800,000 Units)

100 TABLETS
Rx Only


WEST-WARD
A HIKMA COMPANY

Store at 20° to 25°C (68° to 77°F) [See USP Controlled Room Temperature].
 Dispense in a tight container, as defined in the USP.
 Keep tightly closed.
KEEP THIS AND ALL DRUGS OUT OF THE REACH OF CHILDREN.

Each tablet contains penicillin V potassium equivalent to 500 mg (800,000 units) penicillin V.
USUAL DOSAGE: 250 mg to 500 mg every 6-8 hours. See accompanying information.
 Multiple dispensing package - This package is not for household use.
 Manufactured by:
 Hikma Pharmaceuticals
 PO Box 182400, Amman 11118 - Jordan
 2LAPVTSJ1-E-08/2016
 Dis. by: **West-Ward Pharmaceuticals Corp.**
 Eatontown, NJ 07724



3 0143-9836-018

Exp. Date:
Control No.:



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 re-colonization of pharyngitis infection in the future.

VIAL

Benzathine Penicillin

600.000 I.U.

Sterile Benzathine Penicillin
B.P/ USP

Use immediately after
reconstitution.

For **I.M** use only



Asia pharmaceutical industries



VIAL

Benzathine Penicillin

1.2 M.I.U.

Sterile Benzathine Penicillin
B.P./USP

Use immediately after
reconstitution.

For **IM** use only



Asia pharmaceutical industries



TABLE 359-4 American Heart Association Recommendations for Duration of Secondary Prophylaxis^a

CATEGORY OF PATIENT	DURATION OF PROPHYLAXIS
Rheumatic fever without carditis	For 5 years after the last attack or 21 years of age (whichever is longer)
Rheumatic fever with carditis but no residual valvular disease	For 10 years after the last attack, or 21 years of age (whichever is longer)
Rheumatic fever with persistent valvular disease, evident clinically or on echocardiography	For 10 years after the last attack, or 40 years of age (whichever is longer); sometimes lifelong prophylaxis

REFERENCES:

- 1. Respiratory and Direct Contact Introduction and General Considerations**
https://www.ehealthsask.ca/services/Manuals/Documents/Section%20%20Combined%20January%202020.pdf
rs after the first attack.
- 2. Republic of Iraq Ministry of Health Public Health Directorate
Communicable Diseases Control Center**
- 3.https://www.ehealthsask.ca/services/Manuals/Documents/Section%20%20Combined%20January%202020.pdf**
rs after the first attack.