

# **Group A Streptococcus**

**(Streptococci pyogenes)**

- Most common pathogen of the Streptococci. All Group A are sensitive and the rest are resistant to Bacitracin. It may be capsulated.

### **Extracellular products:**

- 1) Streptokinase:
- 2) DNase

### **4 Main DNases: ABCD**

- Antibodies produced against DNase B (anti-DNase B) is useful for diagnosing recent Group A streptococcal infections especially skin infection.

3) Erythrogenic exotoxin:

- Produced only by Group A Streptococci lysogenised by a  $\beta$ -bacteriophage. It is also called *Streptococcal pyrogenic exotoxin* (SPE) as ABC and the one associated with most diseases is type A. It causes the reddened skin rash in scarlet fever.

4) Streptolysin (haemolysin) – Lyses all types of cells, not only RBC 2 types

a) Streptolysin O – Oxygen labile

b) Streptolysin S – Oxygen stable and is responsible for the  $\beta$  haemolysis on blood agars.

- 5) Leucocidin – destroys WBC and platelets.
- 6) Hyaluronidase breaks hyaluronic acid cement.

## Pathogenesis:

Causes suppurative infections and non-suppurative complications.

### A- Suppurative Infections

#### a) Virulence factors

- (i) Principal virulence factor is the M protein.
- (ii) Lipotechoic acid (LTA)

#### b) Diseases:

## 1) Tonsillitis/Pharyngitis

- Acute suppurative infection of the tonsils & pharynx. Prevalent in children. Infection acquired through inhalation of respiratory droplets.
- Most common bacterial infection of throat.
- May spread to adjacent tissues and cause: Peritonsillar abscess (Quinzy), sinusitis, otitis media, brain abscess and may even spread to the blood - septicaemia.

## 2) Impetigo (pyoderma) –

- An infection of the epidermis presenting as pustules.

- 3) Erysipelas – serious infection often complicating surgical wounds. It is a spreading infection of the dermis.
- 4) Cellulitis – A spreading infection of the subcutaneous tissue.
- 5) Scarlet fever – this is a combination of tonsillitis and a red skin rash (erythematous rash) caused by group A streptococci lysogenised by  $\beta$ -bacteriophage which produce the streptococcal pyrogenic exotoxin (SPE).
- 6) Puerperal sepsis – acute infection of the female genital tract and adnexa during the puerperium especially in the first week after birth.

## 7) Severe necrotising fasciitis and other soft tissues

### Epidemiology of Streptococcal Infections:

#### 1) Acquisition

#### 2) Sources of Infection

- a) Those with active disease or convalescent carriers in throat.
- b) Asymptomatic carriers – the most common source. Up to 20% of school going children may carry Group A streptococci in their throats.

3-Age group: Prevalent in children especially between 3-8 years.

B-Non-suppurative complications of Group A Streptococcal infections.

a) Acute Rheumatic fever

Considered to be an autoimmune disease involving the myocardium and its valves, connective tissues and the big joints.

b) Acute glomerulonephritis

Due to antigen-antibody complexes deposited on the basal membrane of glomeruli.



## Diagnosis of suppurative infections:

### 1) Specimen

**Swabs:** wounds  
throat

**Blood**

**Aspirates**

### 2) Culture – B.A at 37°C

Aerobic; 18-24 hrs. incubation period

### 3) Bacitracin Test

### 4) Lancefield grouping

## Treatment:

- 1) Penicillin: **All group A are sensitive to Penicillin**  
(Antibiotic of first choice)

## Other antibiotics:

- Erythromycin/other macrolides → inpatient allergic to penicillin
- Cefuroxime & the 3<sup>rd</sup> generation → in severe cases
- Cephalosporins e.g. Ceftriaxone

# Group B Streptococci

(*Streptococci agalactiae*)

- A member of the normal flora of the female genital tract – the rectum being the principal reservoir of the organism.

### **Diseases caused by Group B Streptococci:**

Important in neonatal infections:

- a) Early –onset disease: Severe disease develops within 24-48 hrs after birth Infection acquired either in-utero or during passage through birth canal.

## Associated with:

- Ruptured membranes >18 hrs before birth.
- Multiple birth (twins etc)
- Premature rupture of membranes
- Premature delivery
- Maternal fever
- Maternal age <20 yrs.

Disease presents as Respiratory Distress Syndrome or Septicaemia or Meningitis.

## b) Late – Onset Disease:

- Often occurs in full term neonates without any underlying disease.
- Infection occurs in the 2<sup>nd</sup> week after birth up to 3 months.
- Prognosis better than early onset: Mortality rate about 10%.
- Usually presents as meningitis.

## Treatment:

- Penicillin / Ampicillin for 10-14 days.
- Sometimes may be combined with Gentamicin.

## Prevention :

- Screen all pregnant women at 35-37 weeks by taking both rectal and high vaginal swabs.
- Give I.V. penicillin as early as possible after onset of labour. Continue with oral penicillin, after labour, for an extra 5-7 days. (Alternatives to penicillin: Erythromycin or Clindamycin)