

STREPTOCOCCOSIS

<p style="text-align: center;">DEFINITION</p> <ul style="list-style-type: none"> A number of clinical syndromes caused by streptococcal infection. Form a part of the normal flora of man and animals Many species are pathogenic to man 	Classified on the basis of haemolysis (α, β, or γ) on blood agar plate		
	<i>Beta haemolytic strept</i>	<i>Alpha hemolytic strept.</i>	<i>Non hemolytic</i>
	(Strep. pyogenes)	(Strept viridians)	(strept fecalis)
	produce complete hemolysis.	produce partial haemolysis with greenish discoloration of blood agar	Produce no change or haemolysis on blood agar

PATHOGENICITY OF STREPTOCOCCUS PYOGENES

A. Infection by the organism itself:

Usually affecting:

1. Throat: Sore throat
2. Skin: Impetigo.
3. Eye: Purulent conjunctivitis

B. Invasion of different parts of the body either:

1. The organism itself through spread from infected organs or septicemia.
2. Its products of exotoxins as :
 - the erythrogenic toxin
 - fibrinolysin
 - streptolysin O
 - hyaluronidase.

These toxins may cause erysipelas, cellulites, puerperal sepsis and their sequelae in unmanaged cases.

C) Sensitization of the body to product of the organism

Sensitization of the body to certain products of the organism few weeks after infection of the upper respiratory tract or skin when not properly managed.

1. Rheumatic fever
with the risk of developing rheumatic heart disease if not properly managed.

2. Acute glomerulonephritis
Immunological response to streptococcal antigens in the population

DISEASES PRODUCED BY STREPTOCOCCUS PYOGENES

1- Streptococcal pharyngitis or tonsillitis (sore throat)

It is the commonest form of streptococcal infection and the most important for its sequelae and complications.

1. Impetigo: mixed streptococcal / staphylococcal infection occurring usually in young children.
2. Erysipelas and its sequelae: neglected cases may be followed by spread of infection causing (lymphangitis, lymphadenitis and finally septicemia)
3. Osteomyelitis: occurs when infection reaches bone.
4. Toxic shock syndrome.

3-Puerperal sepsis:

- It is a form of wound infection following abortion or delivery causing endometritis
- If unmanaged infection spreads rapidly causing pelvic cellulites, localized peritonitis, pelvic thrombophlebitis , salpingitis , generalized peritonitis and septicemia.

2-Wound infection:

4-Others:

1. Purulent conjunctivitis and scarlet fever .
2. Auto immune diseases
 - rheumatic fever
 - acute glomerulonephritis
 - Henoch-Schonlein purpura

Streptococcus group A infections. Erysipelas is a group A streptococcal infection of skin and subcutaneous tissue.



Erysiplas



Erythema secondary to group A streptococcal cellulitis.



Streptococcus group A infections. Necrotizing fasciitis rapidly progresses from erythema to bullae formation and necrosis of skin and subcutaneous tissue

Streptococcal Infection Of Skin



Skin infections With necrosis & gangrene



PUBLIC HEALTH SIGNIFICANCE :

- The incidence of *S. pyogenes* infections and their sequelae are not well documented in Egypt or in other developing countries.
- Acute pharyngitis is one of the most common reasons for seeking medical advice.
- It occurs in sporadic cases all over the year.
- Morbidity and mortality from puerperal sepsis has been decline dramatically after good medical care and wide use of antibiotics.
- It may lead to dangerous systemic auto immune complication, namely; rheumatic fever and acute glomerulonephritis and their sequ1ae.

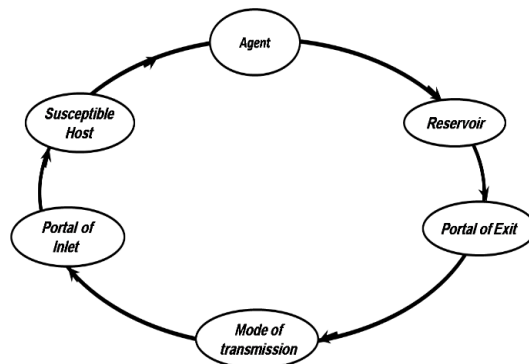
Modes Of transmission		Infectious cycle	
Direct through:	Indirect through:	- Identification of the disease	- Mode of transmission
1. Droplet infection.	1. Dust.	- Occurrence of the disease; incidence prevalence & distribution	- Incubation period .
2. Contact infection	2. Milk – borne infection.	- Causative agent	- Period of communicability .
		- Reservoir: human & animal/zoonosis	- Susceptibility and resistance
			- Clinical picture
			- Diagnosis & case definitions

Chain or cycle of infection

A process that begins when an **agent** leaves its **reservoir** or host through a portal of **exit**, and is conveyed by some mode of **transmission**, then enters through an appropriate portal of entry to infect a susceptible **host**.

Prevention & control

- Discontinuity of the chain at any link means stoppage of infection and elimination of disease which is the principle of disease control.
- These Principles if properly implemented , it will lead to either :
 1. Prevention
 2. Control
 3. Elimination
 4. Eradication



Streptococcal diseases caused by Group

A beta-hemolytic streptococci (*S. pyogenes*)

-- Summary

- Sore throat, pharyngitis & tonsillitis
- Scarlet fever
- Skin & soft tissue Infections: impetigo, cellulitis, erysipelas, wound Infections.
- Puerperal sepsis
- Auto immune diseases: rheumatic fever, acute glomerulonephritis and Henoch-Schonlein purpura

DEFINITION

STREPTOCOCCAL PHARYNGITIS & TONSILLITIS	SCARLET FEVER	RHEUMATIC FEVER	PUERPERAL SEPSIS
<p>Acute infectious disease characterized by</p> <ul style="list-style-type: none"> • sore throat • constitutional manifestations 	<p>It is a form of streptococcal diseases characterized by</p> <ul style="list-style-type: none"> ▪ a focus of streptococcal infection, usually pharyngitis ▪ toxæmia with a characteristic rash. 	<p>It is non suppurative systemic complication following infection of group A-B-haemolytic streptococci</p>	<p>Acute disease characterized by</p> <ul style="list-style-type: none"> ▪ fever accompanied with local & general signs of bacterial invasion of the genital tract in the postpartum or post-abortion patients.

CAUSATIVE AGENT

STREPTOCOCCAL PHARYNGITIS & TONSILLITIS	SCARLET FEVER	RHEUMATIC FEVER	PUERPERAL SEPSIS
<p>Group A, B haemolytic streptococci with more than 80 serotypes.</p> <p style="text-align: center;">Reservoir:</p> <p>Man in the form of</p> <p>Cases: typical or atypical</p> <p>Carriers: Incubatory, contact, convalescent and healthy carriers.</p> <p>Incubation period: 1-3 days.</p> <p>Exit:</p> <p>Nasopharyngeal discharges .</p>	<ul style="list-style-type: none"> • Toxigenic strains of Group A beta-hemolytic streptococci, they produce One main toxin; So • The individual gets one attack of toxemia and rash • Or even none with subclinical antitoxic immunity 	<p style="text-align: center;">Host Related Factors :</p> <ol style="list-style-type: none"> 1. Genetic predisposition, as rheumatic fever in families. 2. Age of first attack: 5-15 years. Repeated attacks are common if 1st attack passed untreated. <p style="text-align: center;">Environmental factors</p> <ul style="list-style-type: none"> - Attack rate of acute rheumatic fever following URTI varies 0.3-3.0% of individual with untreated or inadequately treated. - Bad housing conditions as bad ventilation & overcrowding that support transmission of infection & repeating of infection . 	<ul style="list-style-type: none"> • Group A beta hemolytic streptococci • Other organisms as Staph aureus ,E coli, Anaerobic streptococci, Cl .welchii and Cl. tetani <p style="text-align: center;">Reservoir:</p> <p>Man in the form of</p> <ul style="list-style-type: none"> • Cases: suffering from any disease caused by group A B-haemolytic streptococci • Carriers: Nasal or throat carriers.

RHEUMATIC FEVER	PUERPERAL SEPSIS
<p style="text-align: center;">Public health significance</p> <ul style="list-style-type: none"> • It have high prevalence affecting children and interfering with their physical or psychological development. • It is one of the serious complications that follow streptococcal pharyngitis by about 1 – 4 week, when antibodies against streptococcal antigens reach their peak. 	<p style="text-align: center;">Mode of transmission:</p> <p>Indirect transmission:</p> <p>Vehicle-borne: By contaminated hands or instruments that handle the wound during labor or abortion or <u>Autoinfection</u> where The mother herself can infect the wound by contaminated hand .</p> <p>Direct transmission:</p> <p>Direct droplet, <u>from nasopharyngeal discharge</u> of birth attendant who may be a case or carrier</p>
<p style="text-align: center;">Pathogenesis :</p> <ol style="list-style-type: none"> 1. Cross reaction between streptococcal antibodies and tissues of patient due to repeated untrated attacks. 2. Abnormal immunological response 3. This theory is supported by the occurrence of rheumatic fever after a latent period of 1-3 weeks after infection. 4. There is cross reactivity between M protein and human tissue. Immune response of M protein can also attack tissue. 5. Heart reactive antibodies and antibodies to somatic streptococci are found in sera of rheumatic fever patients. 	

CLINICAL FEATURES

STREPTOCOCCAL PHARYNGITIS & TONSILLITIS	SCARLET FEVER	RHEUMATIC FEVER	POST STREPTOCOCCAL GLOMERULONEPHRITIS
<ul style="list-style-type: none"> Sudden onset of fever sore throat, or pharyngitis headache & malaise pain enlarged and tender cervical lymph nodes. Inflammation of pharynx, tonsils and soft palate with edematous areas with purulent exudates. Tonsils are enlarged with yellowish follicular purulent spots which are easily removed. 	<p>1. Primary streptococcal lesion; streptococcal sore throat wound, skin or puerperal infection</p> <p>2. Strawberry tongue</p> <p>3. Exanthem: The rash is usually fine erythema punctuate blanching on pressure appearing on the neck, chest, folds of axilla, elbow and groin and inner surface of thigh. The face is not affected but there is flushing of the cheeks and circumoral pallor.</p>	<p>The disease may be preceded 1-3 weeks by any streptococcal infection.</p> <p>Major criteria</p> <ol style="list-style-type: none"> Carditis Arthritis Rheumatic nodules Erythema marginatum Chorea <p>Minor criteria</p> <ol style="list-style-type: none"> Fever Arthralgia 	<ul style="list-style-type: none"> Edema, puffiness of the face hypertension smoky or rusty colored urine . Pallor, lethargy, malaise, weakness, anorexia, headache and dull back pain . Fever not prominent.

DIAGNOSIS

STREP PHARYNGITIS & TONSILLITIS	RHEUMATIC FEVER	POST STREP GLOMERULONEPHRITIS
<p>Clinical picture</p> <p>Laboratory</p> <ul style="list-style-type: none"> Gold standard: culture of swab of tonsils and posterior pharynx Rapid screening test: latex agglutination or ELISA Rising of antistreptolysin O titre 	<ul style="list-style-type: none"> History of streptococcal pharyngitis (scarlet fever, otitis media or erysipelas) 2 to 3 weeks before Raising titre of antistreptolysin O titre which indicate recent streptococcal infection. By Jones criteria; two major or one major and two minors. <p style="text-align: center;">Laboratory findings</p> <ul style="list-style-type: none"> Elevated Erythrocyte sedimentation rate <ul style="list-style-type: none"> - C-reactive protein - leucocytosis Prolonged P-R interval on ECG Past history of rheumatic fever 	<p>Clinical history</p> <p>Physical findings</p> <ul style="list-style-type: none"> confirmatory evidence of antecedent streptococcal infection (ASO or anti-DNAse B) <p>Lab findings</p> <ul style="list-style-type: none"> Anemia, hematuria, proteinuria Urine analysis with RBCs, WBCs and casts

Streptococcal Sore Throat



Streptococcus group A infections. White tongue observed in streptococcal pharyngitis.



Flushing of the cheeks and circumoral pallor.



Strawberry Tongue



STREP PHARYNGITIS & TONSILLITIS		SCARLET FEVER	
COMPLICATIONS		DIFFERENTIAL DIAGNOSIS	
A. Local: 1. Peritonsillar abscess (Quinsy) 2. Cervical abscess 3. Cervical lymphadenitis.	C. GIT: 1. Enteritis 2. Acute mesenteric lymphadenitis	<u>From other rash producing diseases</u> Erythematous, maculopapular or petechial rash 1. Measles & rubella 2. Enteric fever. 3. typhus fever. 4. Drug sensitivity. 5. Meningitis. 6. Erythema marginatum 7. Henoch-Schonlein purpura 8. Pityriasis rosea.	<u>Rash in the form of papulo – vesicular eruption:</u> 1. Chicken pox. 2. Papular urticaria. 3. Herpes simplex. 4. Herpes zoster. 5. Herpes of gestation 6. Dermatitis herpetiform. 7. Impetigo
B. Adjacent structures: 1. Rhinitis 2. Sinusitis. 3. Otitis media. 4. Pneumonia	D. Systemic: 1. Rheumatic fever. 2. Acute glomerulonephritis.		

STREPTOCOCCAL PHARYNGITIS & TONSILLITIS	RHEUMATIC FEVER		PUERPERAL SEPSIS
GENERAL PREVENTION			
<ul style="list-style-type: none"> General Preventive measures for droplet infections Sanitary environment good ventilation and prevention of overcrowdings especially in work places, dormitories and hospitals. Milk sanitation. Health education of publics as regards source, mode transmission and importance of adequate therapy. 	<u>Primary prevention</u> 1. Adequate and proper therapy of streptococcal infection: <ul style="list-style-type: none"> Penicillin is the drug of choice, 250 mg/6 H for children and 500 mg for adults (for 10-14 days). 2. Sanitary environment <ul style="list-style-type: none"> sanitary houses good ventilation prevention of overcrowding milk sanitation health promotion & health education. 	<u>Secondary prevention</u> 1. Control of first attack Acute rheumatic fever by <ul style="list-style-type: none"> Bed rest drugs depending on severity of illness <ol style="list-style-type: none"> Anti-inflammatory agents steroids Prevention of repeated attack of rheumatic fever. <ul style="list-style-type: none"> Benzathine penicillin chemoprophylaxis: 60000 IU. I.M for children and 1.200,000 IU for adults Erythromycin 250 mg in penicillin allergic cases. 	<ul style="list-style-type: none"> General Preventive measures for droplet and contact infections Sanitary hospital environment, sanitary precaution during labor or abortion. Sterilization of all instrument and fomites using in labor or abortion. The birth attendant should follow sanitary precaution, washing hands, mask and gloves and should be free from infection.

SPECIFIC PREVENTION

STREP PHARYNGITIS & TONSILLITIS	RHEUMATIC FEVER	PUERPERAL SEPSIS	POST STREP GLOMERULONEPHRITIS
<p align="center">Chemoprophylaxis</p> <p>1. Repeated attacks of streptococcal infection should receive therapy for 10 days</p> <p>2. Prevention of RHD: Long acting penicillin 1.200.000 IU IM injection (or half the dose for < 5 children) or oral penicillin 200.000 unit therapy for 10 days (Erythromycin if penicillin allergic)</p>	<p align="center"><i>Tertiary prevention (Cases wit Rheumatic heart disease):</i></p> <p><i>Cont Prevention of repeated attacks of rheumatic fever as previous.</i></p> <ul style="list-style-type: none"> • Special care during any minor operation to protect against subacute bacterial endocarditis. • Follow up and periodic examination. • Rehabilitation, social, educational physical and psychological. • Surgical interference if indicated for valves of the heart. <p><i>Elimination of Rheumatic fever from school</i></p> <ul style="list-style-type: none"> ▪ Culture of the throats of all children ▪ Identify infected individuals ▪ Exclude from school until a negative culture is obtained 	<p align="center">Chemoprophylaxis</p> <p>Repeated attacks of streptococcal infection should receive therapy for 10 days</p>	<p>Penicillin to eradicate the nephritogenic streptococci (erythromycin if allergic)</p> <p>Supportive care of complications</p>

STREP PHARYNGITIS & TONSILLITIS	SCARLET FEVER	RHEUMATIC FEVER
<p align="center">SUSCEPTIBILITY AND RESISTANCE:</p> <p>Age: All ages are susceptible especially in preschool & school age</p> <p>Immunity: is specific, however repeated attacks, may occur due to many serotypes of the causative organisms.</p> <p>Environmental factors</p> <ul style="list-style-type: none"> • Overcrowdings • poor living conditions • bad health habits favor spread of infection 	<p>Immunity:</p> <ul style="list-style-type: none"> • Lifelong antitoxic immunity is acquired after clinical disease or subclinical infection while antibacterial immunity is type specific and repeated attacks may occur due to many serotypes. <p align="center">TEST OF SUSCEPTIBILITY(DICK TEST):</p> <ul style="list-style-type: none"> • Intradermal immunity test (toxin – antitoxin reaction). • Diluted erythrotoxic toxin is injected in the forearm. • Positive test indicates susceptibility (No antitoxic immunity) • Negative test indicate immunity (antitoxic immunity) 	<p align="center">SUSCEPTIBILITY:</p> <p>Age: it is essentially a disease of childhood and adolescents 5-15 Year.</p> <p>Sex: more in females than males.</p> <p>Environment: the disease is more in winter than summer more, more prevalent in areas with low socioeconomic population, poor housing condition and overcrowding which favor spread of streptococcal infection.</p>

STREP PHARYNGITIS & TONSILLITIS		PUERPERAL SEPSIS
<ul style="list-style-type: none"> ▪ Early case finding ▪ Notification to local health office ▪ Isolation at home. 	<p align="center">Contacts</p> <ul style="list-style-type: none"> ▪ Surveillance for 3 days for case finding ▪ Chemoprophylaxis in high risk close contacts 	<ul style="list-style-type: none"> ▪ Early case finding any rise of temperature within 2 weeks after labor or abortion ▪ Notification to local health office Isolation at home or hospital?
<p>Oral penicillin 500mg for adults 6 hours for 10 days (250 for children) to prevent complication.</p> <p>Erythromycin in penicillin allergic cases.</p> <p align="center">Release after 24 hours from starting treatment</p>	<p align="center">Treatment</p>	<p align="center">Penicillin or other antibiotics</p> <p>Release Until 3 negative successive cultures from discharge taken at least 24 hrs. apart, and not less than 24 hrs. after cessation. of antimicrobial therapy.</p>
<p>for all articles in contact with patients discharges</p>	<p align="center">Concurrent disinfection</p>	<p>for all articles in contact with patients discharges & terminal for the room.</p>

