STREPTOCOCCAL INFECTION

Bacteriology : Streptococci are Gram ′s positive cocci when divide it arrange in chains and pairs . It classified according to their hemolytic property in blood agar to α – hemolytic streptococci which cause partial hemolysis like streptococcus pneumoniae and Viridans alpha hemolytic streptococci , and β- hemolytic streptococci which cause complete hemolysis of the blood agar and it further have sub classification (A,B,C ..etc) and, or it classified according to their serotypes and there are many other classifications . Streptococcal bacteria secrete toxin called exotoxin and it also classified to O,S ,A and C types called streptolysin O ,S ,C or A . These toxins either cause toxic effects like scarlet fever and streptococcal toxic shock syndrome or induce immune response against these toxins like anti-streptolysin O antibody (ASOT Ab.) .

Streptococci are nasopharyngeal and gut commensal .

Pathogenesis of streptococcal infection

Either streptococcal bacteria cause direct infections to organs like cutaneous infection commonly with group A of β- hemolytic streptococci like Impetigo , cellulites , erysipelas , necrotizing fasciitis . Other species may cause neonatal septicemia ,infective endocarditis ,acute meningitis ….etc .

Or it cause its disease through direct effect of toxins like scarlet fever and streptococcal toxic shock syndrome commonly with streptolysin A and C exotoxins .

Or it cause its effect through immune response against streptococci weeks or months after streptococcal infection like rheumatic fever and post –streptococcal glomerulonephritis .Here the antigenicity of bacteria similar to antigenicity of human tissue so the immune response of bacteria attack similar body tissue .The streptococcal infection diagnosed by Gram ′stain with culture and sensitivity test or antibody study against streptococcal antigens or toxins like ASOT Ab. Finally diagnosed by PCR study .

Clinical presentation : Streptococci have many clinical implication in medicine :

1- Skin presentation of streptococcal infection :
   a- Cellulitis : infection of subcutaneous tissues, common in elderly ,diabetic patients or immunocompromised patients presented as red ,hot tender, swollen skin with fever and regional lymphadenopathy ,common site is the legs ,the patient has leucocytosis and anti –streptococcal Ab is positive . Caused by group A, C and G Streptococci . It treated by intravenous benzyl penicillin 500 mg 6 hourly if allergic to penicillin, erythromycin 500 mg 6 hourly is used .

b- Erysipelas : Infection of dermis and upper subcutaneous tissues by group A streptococci it differentiated from cellulitis that it has well demarcated edge usually presented in the face has similar treatment to cellulitis .

c- Necrotizing fasciitis : Infection of skin ,subcutaneous tissue and fat ,it is medico-surgical emergency it leads to sever inflammation rapidly extend with fat plane associated with sever systemic inflammatory response like fever ,rigor the pain is less sever due to nerve ending damage, palpable gas may be felt by hand and may complicate to toxic shock syndrome , it classified into type 1 caused by gram ′s negative bacteria and anaerobes and type 2 caused by group A streptococci . It treated by surgical debridement with mixed antibiotics that cover gram ′s negative ,positive and anaerobes bacteria (like pipercillin –tazobctem plus clindamycin and ciprofloxacin another group include meropenem or third generation cephalosporin plus metronidazole .

2- Scarlet fever : It caused by group A and occasionally group C or G Streptococci usually occur complicating acute pharyngitis or tonsillitis due to streptococcal exotoxine A , and it occur at school age children and may affect adults contacting infected children . the patients presented with fever ,erythematous rash on the body which blanch on pressure , circumoral pallor ,the tongue coated then red and swollen called strawberry tongue the disease lasts 7- 10 days then followed by skin desquamation ,residual petechial rash in anticubital fossa called pastis ′s syndrome . Treated by benzyle penicillin IV. or orally if allergic erythromycin is used for 10 days paracetamol tablets 3 times daily to relieve fever and pain .

3- Streptococcal toxic shock syndrome : Occur with group A streptococcal infection complicating skin infection or necrotizing fasciitis streptococcal exotoxin A is secreted the patient presented with faint erythematous rash followed by sever hypotension if not well treated it lead to multi-organ failure . It treated by parental benzyl penicillin plus clindamycin to inhibit toxin production and immunoglobulin is administered also ,intravenous fluid resuscitation and if necrotizing fasciitis present it treated as above measures .

4- Alpha –hemolytic streptococci (Strep. Mitis ,sanguis ,mutans and salivarius): it cause endocarditis and septicemia in immunosupressed patient .

5- β streptococci group B it cause neonatal infection including meningitis and female pelvic infection .

6- β streptococci group C it cause septicemia , cellulites and pharyngitis .

7- Enterococcus faecalis : Endocarditis and urinary tract infection .

8- Anaerobic streptococci : Cause peritonitis , liver abscess ,dental infection and pelvic inflammatory disease .

STAPHYLLOCOCCAL INFECTIOM

BACTERIOLOGY :

It is Gram ′s positive bacteria normally commonsals of skin and mucus membrane, it divided to form a grape shape line of division , it secrete coagulase enzyme that cause clot in blood in vitro so staphylococcus bacteria classified as coagulase positive bacteria like staphylococcus aureus which is the most important type and staphylococcus intermedius and coagulase negative bacteria like staphylococcus epidermedius . It secrete exotoxine which has systemic implication in human like sever systemic inflammatory response syndrome . It is facultative anaerobic that it live in aerobic condition usually and can live and divide in anaerobic conditions .If staphylococci enter the blood stream can cause distal infections to the body like bones ,joints ,endocardium of the heart ,lungs …etc .

Diagnosis : staphylococci diagnosed in addition to the clinical features can diagnosed by Gram′ s stain with culture and sensitivity test so positive culture for staphylococci should consider real non contaminated unless all other circumstances excluded and repeated culture if negative , or by PCR study if all other test negative .

Clinical features

1- Skin infection : Impetigo : Infection of superficial skin cause local sore or blister commonly in face of children usually caused by staphylococcus aureus or by group A of β- hemolytic streptococci .
   Ecthyma : Crusted sore
   Follculitis : Infection of hair follicle
   Other skin infection like carbuncle , furuncle , bullous impetigo .

Scalded skin syndrome : Commonly in children formed some strains of staphylococci where it secrete toxin lead to skin inflammation , blistering and lysis of epidermis this may occur away from the site of infection .

Wound infection : This is occur usually post- operatively lead to wound infection and pus collection , it prevented by good aseptic maneuvers local and systemic antibiotics . Treated by anti-staphyllococcal antibiotics like flucloxacillin or macrolid antibiotics or vancomycin infusion if allergic to penicillin with pus drainage from wound .

Cannula-related infection : This extremely common condition and it is a source of bacteremia and it more serious with central venous line catheter , double lumen venous catheter for hemodialysis where it may transmit infection to right side of the heart to cause infective endocarditis . In cannula site infection there will local phlebitis with hot ,red and tender site and low grade fever treated by removing cannula or implanted device with local and may need systemic anti-staphylococcal antibiotics .

Meticillin –resistant Staphyllococcus aureus MRSA : This is medical problem due to resistance of bacteria to flucloxacillin and other group of penicillin due to protein mutation of bacteria it constitute 40% of staphylococcal bacteremia usually hospital acquired bacteria now there is vancomycin and teichoplanin resistant staphylococci(VRSA) . It treated by culture and sensitivity of bacteria and usually respond to clindamycin , cotrimoxazole antibiotics ,linezolid or daptomycin antibiotics .

Staphylococcal toxic shock syndrome :

It serious condition due to staphylococcal aureus infection producing toxin 1 which stimulate immune response especially T-helper cells and polymorphnuclear leucocytosis ,this toxin lead to fever ,myalgia ,arthralgia ,headache and vomiting followed by generalized erythema of the body which blanche on finger pressure then hypotesion this reduction in blood pressure may lead to multiorgan failure kidneys ,respiratory system ,consciousness and heart then other organs where it threaten the life . Mortality rate about 10- 20% , if patient improved it followed by desquamation of the skin and condition may reoccur after cure .

Diagnosis : Is clinical with Gram′ s stain from site of staphylococcal infection with culture to diagnose type of toxin 1 .

Treatment : Good amount of fluid replacement to correct hypotension and anti-staphylococcal antibiotics like flucloxacillin and vancomycin infusion . support of organs in multi-organs failure .