

Genus: *Neisseria*

Species: *meningitidis and gonorrhoeae*

Neisseria meningitidis.



Neisseria meningitidis, is simply known as *meningococcus*, is aerobic, gram negative diplococcus. It exists as normal flora in the throat or nasopharynx of up to 40% of individuals. It may be seen in genital tract area where its presence is of no pathological significance.

Neisseria meningitidis is non motile and non spore forming. *N. meningitidis* has a polysaccharide capsule that surrounds the outer membrane of the bacterium and protects against immune mechanism of human. It is considered to be an essential virulence factor for the bacteria. Based on the capsular polysaccharide, nine serogroups of *Neisseria meningitidis* have been identified.

Pathogenesis

Meningococcal infection begins when the bacteria colonizes the nasopharyngeal and tonsillar mucosa. First the bacteria attach to the non ciliated columnar epithelial cells of the nasopharynx, this attachment is mediated by pili and possibly by other outer membrane components, then the meningococci initiates crosses the epithelial barrier, and therefore gains access to the bloodstream. The characteristic movement of meningococci is tropism towards the central nervous system. Once the bacteria cross

the blood-brain barrier, the host then develops purulent meningitis. The bacteria have to be able to escape innate and acquired immune responses. **Untreated meningococcal meningitis has a mortality approaching 85%.**

Symptoms

Though it initially produces with general symptoms like fatigue, Skin rash associated with meningitis, weakness, nausea, vomiting, and headache, it can rapidly progress from fever, headache and neck stiffness to coma and death. Death occurs in approximately 10% of cases.

Virulence

Lipoooligosaccharide (LOS) is a component of the cell wall of *N. meningitidis* which acts as an endotoxin. Other virulence factors include a polysaccharide capsule which prevents host phagocytosis and aids in evasion of the host immune response; and fimbriae which mediate attachment of the bacterium to the epithelial cells of the nasopharynx.

Diagnosis

- 1- Gram staining of deposit of CSF demonstarates intracellular as well as extracellular gram negative diplococci.
- 2- Culturing of specimen (CSF) on chocolate agar for identification of the organism.

3- Further testing to differentiate the species includes testing for oxidase and utilizing of carbohydrate like maltose, sucrose, and glucose .

4- Blood cultures if the organism reaches the circulation system.

Treatment & prevention

Rifampin which is most effective in eradicating nasopharyngeal carriage of *N. meningitidis*, is the drug of choice administered to close contacts upon diagnosis of the primary case but should not be taken during pregnancy.

Penicillin G, ampicillin, oily chloromphenicol, and many others are the drugs commonly used in antibiotic therapy.

- Polysaccharide vaccine against some sero groups of *Neisseria meningitidis* is available.



Neisseria gonorrhoeae

- *N. gonorrhoeae* or Gonococcus (GC) is a gram negative, kidney shaped diplococcus. It causes gonorrhea which is a sexually transmitted disease (STD). Man is the only natural host of *N. gonorrhoeae*. Gonorrhoea has been identified as co-factor of HIV transmission. In the presence of gonorrhea, HIV transmission increased by a factor of 3 to 5 times. Further untreated gonococcal infection can cause pelvic inflammatory disease (PID) which may lead to chronic pelvic pain, ectopic pregnancy and infertility.

Diseases

Majority of women together with a proportion of men infected with *N. gonorrhoeae* are asymptomatic. In symptomatic patients, gonorrhea present as lower genital tract infection leading to urthritis, cervicitis, extending to salpingitis, endometritis and related sequelae in women; urthritis and epididymitis in men; and proctitis, pharyngitis and conjunctivitis in both sexes. *N. gonorrhoeae* can also lead to gonococcal ophthalmia, a non venereal infection in newborns, which result from direct infection during passage through the birth canal.

Symptoms

Gonorrhoea can be present in an individual without producing symptoms. 90% of women may have no symptoms at all and even when a woman does have symptoms, they can be confused with urinary tract infections (UTIs) or vaginal infections. Often, the first indication a woman is infected may arise when a partner is diagnosed.

In Females Symptoms may include:

- Burning during urination
- Yellowish-greenish discharge from the vagina
- Pain in the pelvic or abdominal area
- Fever
- Unusual vaginal bleeding
- Painful and Bleeding after sexual activity .

In Males are more likely to have symptoms, but symptoms in men can also go undetected. In men, symptoms may include:

- Burning during urination
- Yellowish-white discharge from the male genital organs.
- Fever
- Swollen or painful testicles

Diagnosis

- **Clinical:** The symptoms of gonorrhea differ between the sexes. In men, a urethral exudates containing Gram- negative diplococci is common; in women, disease is often asymptomatic.
- **Laboratory:** *Neisseria* may be cultured on Thayer-Martin agar or other suitable media with incubation in 10% CO₂. *Neisseria* are strongly oxidase-positive, Gram-negative diplococci. *N. gonorrhoeae* utilize glucose only, while *N. meningitidis* utilize both glucose and maltose.

Control

- **Sanitary:** Avoiding sexual contact with infected persons can prevent infections.
- **Chemotherapeutic:** Uncomplicated gonococcal infection can be treated with ciprofloxacin or ceftriaxone. Because some strain of *N. gonorrhoeae* producing penicillinase, so penicillin no longer considered as a drug of choice for treating gonorrhea.