Meningococcal Meningitis

Facilitator:
Dr. NAVPREET
Assistant Professor, Department of Community Medicine
Govt. Medical College & Hospital, Chandigarh.

Specific Learning Objectives

- At the end of session, the learner shall be able to describe:

➢ Epidemiology of meningoccoal meningitis

➢ Diagnosis and treatment

➢ Prevention and control

Introduction

- **Meningococcal meningitis**

➢ Bacterial form of meningitis

  ➢ Several different bacteria

  ➢ *Neisseria meningitidis*

  ➢ Six out of twelve serogroups (A, B, C, W135, X and Y) can cause epidemics.

➢ It can cause severe brain damage

➢ Fatal in 50% of cases if untreated.

  ➢ Even when the disease is diagnosed early and adequate treatment is started, 5% to 10% of patients die, typically within 24 to 48 hours after the onset of symptoms.

Epidemiology

- Epidemic rates of meningococcal disease varies:
  - <1 - 3/100,000 in many developed nations
  - 10 - 25/100,000 in some developing countries.

- Occurs in small clusters throughout the world
- Seasonal variation

Outbreak trends

- **The meningitis belt**

➢ The largest burden of meningococcal disease occurs in an area of sub-Saharan Africa which stretches from Senegal in the west to Ethiopia in the east.

➢ During the dry season between December to June

✓ dust winds, cold nights and upper respiratory tract infections combine to damage the nasopharyngeal mucosa

✓ facilitated by overcrowded housing and by large population displacements.

India

- Isolated cases of meningococcal meningitis have been reported from many Indian states
  - including Haryana, Uttar Pradesh, Rajasthan, Sikkim, Gujarat, Jammu & Kashmir, West Bengal, Chandigarh, Kerala and Orissa.
- Serogroup A has been associated with all the repeated outbreaks of meningitis,
- Serogroup B and C have been detected in a few

Transmission

- Person-to-person
- Droplets of respiratory or throat secretions from carriers.
- Close and prolonged contact with a carrier facilitates the spread of the disease
  - ➢ such as kissing, sneezing or coughing on someone, or living in close quarters (such as a dormitory)
- The average incubation period is **four days**
  - – can range between two and 10 days.

- *Neisseria meningitidis*

➢ only infects humans

➢ no animal reservoir

➢ The bacteria can be carried in the throat and sometimes, can overwhelm the body's defenses allowing infection to spread through the bloodstream to the brain.

Symptoms

- Most common:
  - stiff neck, high fever, sensitivity to light, confusion, headaches and vomiting.
- Less common but even more severe (often fatal):
  - meningococcal septicaemia, which is characterized by a haemorrhagic rash and rapid circulatory collapse.

- Bacterial meningitis may result in brain damage, hearing loss or a learning disability in 10% to 20% of survivors.

Diagnosis

- History & clinical examination
- Lumbar puncture
  - ➢ purulent spinal fluid
  - ➢ microscopic examinations of the spinal fluid
- Supported or confirmed by growing the bacteria

  agglutination tests or by PCR.

- The identification of the serogroups and susceptibility testing to antibiotics are important to define control measures.

Treatment

- A medical emergency.
- Admission to a health institution is necessary
  - isolation of the patient is not necessary.
- Appropriate antibiotic treatment
  - ideally after the lumbar puncture has been carried out if such a puncture can be performed immediately.
  - if treatment is started prior to the lumbar puncture it may be difficult to grow the bacteria from the spinal fluid and confirm the diagnosis.

- A range of antibiotics
  - Penicillin,
  - Ampicillin,
  - Chloramphenicol,
  - Ceftriaxone.

- Under epidemic conditions in areas with limited health infrastructure and resources, **Chloramphenicol or Ceftriaxone** are the drugs of choice because a single dose has been shown to be effective in meningococcal meningitis.

Prevention

- Types of vaccines:
- Polysaccharide vaccines
  - bivalent (groups A and C)
  - trivalent (groups A, C and W)
  - tetravalent (groups A, C, Y and W135)

- Group B ???

- Antigenic mimicry
- Outer membrane proteins (OMP) and strain-specific to control specific epidemics
  - particular in Cuba, New Zealand and Norway.
- Additional universal group B protein vaccines are in late stages of development.

- Meningococcal conjugate vaccines:
  - Against group C have been available and widely used since 1999.
  - Tetravalent A, C, Y and W135 conjugate vaccines have been licensed since 2005
    - in Canada, the United States of America, and Europe.
  - In December 2010, a new meningococcal A conjugate vaccine
    - in Burkina Faso, and in selected regions of Mali and Niger.

- The **conjugate vaccine has several advantages** over existing polysaccharide vaccines:

- it induces a **higher and more sustainable immune response** against group A meningococcus;
- it **reduces the carriage** of the bacteria in the throat and thus **its transmission**;
- it is available at a **lower price;**
- it is expected to be particularly effective in protecting **children under two years of age**, who do not respond to conventional polysaccharide vaccines.
- it is expected to confer **long-term protection.**

Global public health response

- With the introduction of the new meningococcal A conjugate vaccine, WHO promotes a strategy comprising:

➢ **Epidemic preparedness:** surveillance, from case detection to investigation and laboratory confirmation.

➢ **Prevention:** vaccinating all 1-29 year-olds in the meningitis belt with this vaccine.

➢ **Epidemic response:** prompt and appropriate case management with oily chloramphenicol or ceftriaxone and reactive mass vaccination of populations not already protected through vaccination.