Meningococcal Meningitis

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Acute bacterial disease characterized by fever, intense headache, nausea and vomiting and signs of meningial irritation with petechial rash, ecchymosis and viscles. Signs of meningial irritation include: neck stiffness + Kernig's sign + Brudiniski sign for children.

The disease has three common presentations:

1) Infection may be limited to the nasopharynx (asymptomatic).
2) Meningococcal meningitis (meningococcal disease) 90 % of cases.
3) Meningococcaemia the organism present in the blood with no signs of meningial irritation this can be divided into:

a) Acute meningococcaemia: which can be either acute fulminant meningitis, or acute fulminant encephalitis.
b) Chronic meningococcaemia.

- In meningococcaemia since no signs of meningial irritation can be detected, so isolation of the organism in the blood is very important.
- If there is any acute fever with rash (usually present in 50-80%) meningococcaemia must be put in differential diagnosis. The rash is called purpura necrotica or purpura fulmonans, it usually affect the lower extremities extending to the buttocks, usually it carries high fatality rate within the first 24 hours (the rash may transmit the disease).

- **Diagnosis:**

1) CSF: direct test and culture (we look for color turbidity, protein concentration and sugar level).
2) Blood culture.
3) Petechial smear for culture.
4) Serology: type specific polysaccharide Ag is detected by CIE (Counter Immuno Electrophoresis) and latex agglutination.

- **Infective Agent:**
- *Neisseria meningitides* which has many serotypes A, B, C, D, X, Y, Z, E, W135, H.

  A is usually responsible for the epidemics.
- **Occurrence:**
- Worldwide endemic and epidemic, in temperate and tropical climate zones specially during winter and spring. It's a disease of children and young adults especially in crowded areas, affect males more than females.
- **Reservoir:** human only.

- **Mode of Transmission:** Direct contact (droplets) especially from carriers, carrier prevalence of 25 % may exist without cases of meningitis.
- **Incubation Period:** 2-10 days (commonly 3-4 days).
- **Period of Communicability:** Until the organism is no longer present in nose or throat discharges (usually within 24 hours after treatment).

- **Susceptibility & Resistance:**

1) Susceptibility decrease with age.
2) High ratio of Carrier/Case, so cannot be eradicated.
3) Patients with low complement immunity are prone to recurrent disease.
4) Splenectomized persons are prone to bacteriamic phase of the disease. Now days splenectomized persons given 3 types of vaccines:
   a) Meningococcal meningitis vaccine.
   b) Pneumococcal infection vaccine.
   c) H. influenza infection vaccine.
5) Group specific immunity of unknown duration may follow even subclinical infection.
6) Serotypes A, B, C, Y, W135; may cause epidemics.

- **Prevention & Control:**
- **Preventive measures:**

1) Health education & personal food hygiene.
2) Prevent overcrowding.
3) Vaccination: available for types A, C, Y, W135. 7-10 days are required after immunization to produce appreciable antibody levels. The vaccine provide an immunity lasting for 2-3 years. It's an effective vaccine, but it's not given in the program of vaccinations because it's costly, the organism has many serotypes and it does not give a lifelong immunity.
4) Routine immunization is not recommended.

- **Control measures:**

1) Report to the local health authority.
2) Isolation, until 24 hours after the start of the treatment.
3) Concurrent disinfection & terminal cleaning.
4) Quarantine: non.
5) Protection of contacts: close observation of intimate contacts to give chemoprophylaxis, associated family cases usually occur after 5 days, so consider vaccination with chemoprophylaxis.

CHEMOPROPHYLAXIS OF MENINGOCOCCAL MENINGITIS		
Agent & duration	Adults	Children
Rifampicin (2 days)	600 mg every 12 hours	10 mg/kg every 12 hours
Ceftriaxone (single dose)	IM 250 mg (single dose)	IM 125 mg (single dose)
Ciprofloxacin (single dose)	500 mg (single dose)	Avoid

6) Mass chemoprophylaxis is not advised.

7) Routine throat swab for contacts is impractical.

8) Specific treatment:

Crystaline penicillin 24 million unit/ day every 2-3 hours or Chloramphenicol 4-6 gm/ day every 4-6 hours. Penicillin is the first choice, but ampicillin & chloamphenicol are also effective.

- **Epidemic Measures:**

1) Careful surveillance by early diagnosis, prompt treatment.
2) Good separation and ventilation in crowded areas.
3) Mass prophylaxis in closed immunity.
4) Vaccine for special risk group.

- **Notes:**

It’s a disease of children and young adults:

- Neonate less than 1 month: E. coli meningitis, treatment is Gentamycin & 3rd generation cephalosporin.
- Children less than 5 years: H. influenza meningitis, treatment is ampicillin & chloramphenicol.
- Children more than 5 years: meningococcal meningitis, also called community acquired meningitis, treatment is mentioned above.

- Poliomyelitis

It is a viral disease caused by poliovirus which is an enterovirus of picornaviridea (pico=small, rna=RNA virus).

It is acute onset of flaccid paralysis can occur in 3 clinical presentations:

1) **Asymptomatic:** 90-95% of cases, enter through GIT& go out without causing any harmful effect (give long life immunity).
2) **Abortive illness:** 4-8% of cases, flu-like illness due to transient viremia then abortive without signs &symptoms.
3) **Paralytic polio:**<1%, classified as:

a) Minor illness: fever, malaise, headache, nausea& vomiting. This may progress to.

b) Major illness: sever muscle pain & stiffness of the neck &the back followed by the flaccid paralysis which is symmetrical, permanent& with no sensory involvement.

- **Differential Diagnosis:**

Guillain- Barrie syndrome, Myasthenia gravis, Porphyria, Transverse myelitis, Encephalomyelitis, Botulism, Polymyositis & Insecticides poisoning.

- **Infectious Agent:**

Poliovirus (genus enterovirus). It has 3types I, ll & lll. All cause paralysis but mostly I, less commonly III & rarely ll, which are both associated with vaccine polio.

- **Mode of Transmission (M.O.T):**

Feco –oral from person to person or by common source especially in low hygienic level, by (food, milk, water) & sometimes through droplets.

- **Pathogenesis:**

1) The virus enter through the mouth to GIT, penetrate intestinal wall, and go tothe mesenteric lymph nodes.
2) Enter the blood causing transient viremia.
3) Enter the motor cells where it multiply.
4) Re enter the blood causing secondary viremia (permanent).
5) Enter selective tissues:

a) Anterior horn cells: causing lower motor neuron lesion.
b) Brain stem: causing bulbar paralysis (paralysis of muscle of swallowing).
c) Motor cortex: causing encephalitic polio.

- **Diagnosis:**
- Isolation of the virus from stool, CSF& nasopharyngeal secretions &then culture (culture with antibiotic to prevent growth of bacteria).
- Serology: Antibody titer (difficult because it mimics the vaccine antibody titer).

- **Occurrence:**
- Prior to the EPI (**E**xpanded **P**rogram of **I**mmunization) it was common but now decreasing because of immunization & eradication program, occur sporadically or as epidemics usually in area of low sanitation or low vaccine coverage. Few cases of vaccine polio occur every year.
- **Incubation Period:** (7-14) days but sometimes (3-35) days.
- **Period of Communicability (P.O.C):** Not precisely defined but transmission is possible as long as virus is excreted in feces.

- **Susceptibility:**

Universal with trigger factors:

1) IM injection during the incubation period.
2) Tonsillectomy lead to bulbar paralysis.
3) Pregnancy: if pregnant women has polio, this will lead to either abortion or congenital abnormalities.
4) Vaccine polio & shifting of age susceptibility: (when we do vaccination to a special age group, this age group will not be susceptible but the infection may shift to other age group e.g. when we omit the poliomyelitis from children, it may affect the young adults after a period of time.

- **Prevention:**

1) Educate the people about M.O.T.
2) Vaccine OPV & IPV (oral polio vaccine & injectable polio vaccine).
3) Schedule of immunization. We give the vaccine in 0 (at birth), 2,4,6 months & then give booster dosages on 18 & 60 months.

- **Control:**

1) Reports to local health authority.
2) Isolation &enteric precautions.
3) Concurrent disinfection.
4) Quarantine: none.
5) Investigation &protection of contacts.
6) Specific treatment (only conservative treatment).

- **WHO Polio Eradication Program:**

1) **Routine vaccination:** according to the table.
2) **NID's (National Immunization Days):** this is applied two times in the year, each time of two rounds,4-6 weeks apart.(irrespective to immunization state to the children under 5 years). This will increase memory cells &the defense mechanism in the second exposure.
3) **Mopping up:** for controlling those who are not immunized yet & immunize them.

4) AFP (Acute Flaccid Paralysis): to check for any suspected individual of flaccid paralysis (the flaccid paralysis may be not due to poliomyelitis). We consider all the cases of AEP are due to polio until by investigation we prove the reverse. Each community should have at least 1/100000 of flaccid paralysis (i.e. the IR is 1/100000) every year for those less than 15years of age. When the incidence rate is of this number or more, we do 2 stool examinations as soon as possible after the onset of the disease (signs). In interval between each 24-48 hours &put it in fresh media in -20 C^o till we send it to the lab. If the two samples are -ve we neglect it, but when the two samples are +ve that mean it is polio. We must follow the patient if deteriorate or die, this mean it is polio. Then we must re do the examination after 60days if the patient is available. If one sample is +ve & the other is -ve this mean it is not good samples or not cooled well or bad diagnosis.

- **Notes:**
- **Myasthenia gravis:** an autoimmune disease affect neuromuscular junction leading to muscles weakness specially bulbar &extra ocular muscles.

- **Guillian- Barrie syndrome:** acute febrile polyneuritis leading to neurological manifestations like facial nerve palsy& peripheral neuropathy.

OPV(Sabin)	IPV(Salk)
1- Oral	1.Injection
2- Trivalent	2.Monovalent
3- Live attenuated vaccine	3.Killed vaccine
4- Reach GIT&induce local immunity, more preferable, easier in implementation, not expensive, not time consuming.	4. Less preferable, no local immunity, time consuming, not practical as the oral.
5- More than 95% efficacy against I, II & III.	5. More than 95% efficacy but against I only.
6- Side effect of oral vaccine that sometimes it cause “vaccine poliomyelitis” (converted to wild virus although it is rare 1/5 millions).	6. To be given the third dose at least as injectable.

- Mumps

- **Epidemiology:**
- An acute viral disease characterized by fever, swelling and tenderness of one or more of the salivary glands, usually the parotid and sometimes the sublingual or sub maxillary glands. Orchitis most commonly unilateral, occur in 20-30 % of pubertal males. Mastitis occur in up to 31 % of females older than 15 years of age. Sterility is an extremely rare complication. As many as 40-50 % of mumps infections have been associated with respiratory symptoms, particularly in children less than 5 years of age.

- Mumps can cause sensori-neural hearing loss in children, at an incidence of 5 per 100,000 cases. Encephalitis is rare 1-2 per 10,000 cases. Pancreatitis (usually mild) occur in 4 % of cases but suggested association with diabetes remain unproven. Deaths due to mumps are rare. Mumps infection during the 1st trimester of the pregnancy may increase the rate of spontaneous abortion, but there is no evidence that mumps during pregnancy causes congenital malformations.
- Acute mumps infection can be confirmed by a significant rise in IgG antibody titer in acute and convalescent sera, the presence of mumps specific IgM or by positive mumps viral cultures. The virus may be isolated from the buccal mucosa 7 days before until 9 days after salivary enlargement, and from urine 6 days before to 15 days after the onset of parotitis.

- **Infectious Agent:**

Mumps virus, a number of the family paramyxoviridae, genus paramyxovirus, is antigenically related to the parainfluenza viruses.

- **Reservoir:** Humans.
- **Mode Of Transmission:**

Air borne transmission or by droplet spread and by direct contact with the saliva of an infected person.

- **Incubation Period:**

About 15-18 days (range 14-25).

- **Period Of Communicability:**

Virus has been isolated from saliva from 6-7 days before overt parotitis to 9 days after the onset of illness. Maximum infectivity occurs between 2 days before to 4 days after the onset of illness. Unapparent infections can be communicable.

- **Susceptibility & Resistance:**
- Immunity is generally lifelong and develops either after unapparent or clinical infections. Most adults are likely to have been infected naturally and may be considered to be immune, even if they did not have recognized disease. The demonstration of mumps IgG antibody by serologic assays is acceptable evidence of mumps immunity.

- **Prevention & Control:**

A- **Preventive measures:**

1) Public education by health care providers should encourage mumps immunization for all susceptible over 1 years of age.
2) A live attenuated mumps virus vaccine is available either as single or combined with rubella and measles vaccines (MMR).immunization of people already immune, either by wild or vaccine virus infection is not associated with increased risk of adverse reactions (fever, aseptic meningitis, encephalitis and thrombocytopenia, have been reported rarely). More than 95 % of the recipients develop immunity that is long lasting and may be lifelong. Vaccine may administrated at any time after 1 year of age, preferably as MMR at 12-15 months of age. Special efforts should be made to immunized before puberty all persons with no definite history of mumps or mumps immunization.

B- Control measures:

1) Report to local health authority.
2) Isolation: respiratory isolation and private room for 9 days from onset of swelling, less if swelling subsided. Exclusion from school or workplace until 9 days after onset of parotitis if susceptible contacts (those not immunized) are present.
3) Concurrent disinfection: of articles soiled with nose and throat secretions.
4) Quarantine: exclusion of susceptible from school or the workplace from the 12^{th} through 25^{th} day after exposure if other susceptible are present.
5) Immunization of contacts: although immunization after exposure to natural mumps may not prevent disease in contacts, those who do not develop disease would be protected against infection from subsequent exposure, Ig is not effective and not recommended.
6) Investigation of contacts and source of infection: susceptible contacts should be immunized.
7) Specific treatment: none.

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