Meningitis
Cerebrospinal fever

Meningitis caused by many M.O but the commonest type of meningitis is bacterial meningitis which caused primarily by 3 M.O:

1. **Meningo-coccal meningitis (*Neisseria meningitidis*).**
2. ***Streptococcus pneumoniae*.**
3. ***Haemophilus infuenzae* type b (Hib).**

- **Those m.o constitutes 80-90% of all types of meningitis, 5-10% caused by TB meningitis, the rest of meningitis caused by other pyogens, bacteria, virus & even fungi.**

Meningococcal meningitis

Identification: It is an acute bacterial disease characterized by sudden onset of fever, intense headache, nausea, vomiting, neck stiffness ± pink petechial rash (in 50%).

The condition may progress to coma (vary from cloudy consciousness to deep coma).

<u>CFR:</u> Before Rx > 50 %.

After Rx = 8 – 15 %.

- ✓ **In addition 10-20 % of survivors will suffer from long-term squeal as epilepsy, hearing loss (once cranial nerves damage occur, it never return to normal).**
- ✓ **So the earlier the diagnosis, the least the complications and the better the prognosis.**

Diagnosis:

1. Clinical picture.
2. CSF examination and culture (lumber puncture).
3. Blood culture.

2. Infectious agent:

Neisseria meningitidis, 12 sero-groups, only 5 of which (A, B, C, and recently W-135 and X) can cause epidemics. These are important in prevention, control and vaccine preparation.

3. **Occurrence:**

- Distribution world-wide.
- Disease occurring sporadically, some time endemic, and in small outbreaks in most part of the world.

3. **Occurrence:** continue

- In tropical Africa, the disease usually occur in dry season, & there is what is called ***"meningitis belt"*** in sub-Saharan Africa because of frequent epidemic waves (every 7-14 years) that have been occurring in that region with high rate of carriers up to 50% of population during epidemics and 25% during sporadic, including 25 African countries; which stretches from Senegal in the West to Ethiopia in the East (sero-group A).

  Last epidemic in 2009 (88 000 cases).

4. Reservoir: Humans. No animal reservoir.

5. Mode of transmission:

- Direct contacts including respiratory droplets from nose and throats of infected people. Infection usually cause → sub-clinical mucosal infection.
- Up to 10-20% of people may be asymptomatic carrier with nasopharyngeal colonization. Less than 1% of them progress to invasive disease.

5. Mode of transmission: continue

- Polluted fomites transmission is insignificant i.e. indirect transmission is not an important route (since the M.O is delicate one and easily destroyed by U.V light and heat).
- Large population movement and overcrowding facilitate the circulation of virulent strains.

6. I.P: 2 – 10 days, commonly 3 – 4 days.

7. Period of communicability:

- Without Rx until the M.O is no longer present in nose and mouth discharges.
- But usually disappear from nasopharynx within 24 hrs after start antibiotic Rx.

8. Susceptibility:

- Susceptibility to clinical disease is low and decrease with age; this induces a higher ratio of carriers to cases.
- There is group-specific immunity of unknown duration follows even sub-clinical infections.

9. Method of control:

A) preventive measures:

1. Public health education about the need to reduce droplet infection.
2. Avoid overcrowding in living quarters, work places as school, camps & ships.
3. **Vaccines: quadrivalent ACYW-135** vaccine (no vaccine effective against group B meningococci). This vaccine is safe, effective in adults & children above 2 years, but do not elicit long term protection particularly in children under 5 years of age.

   (so not used in routine childhood immunization program).

Quadrivalent A,C,Y,W-135 used in:

- Outbreak control.
- High risk groups:-
  1. Hajj pilgrims, military groups.
  2. Travelers to countries where disease is epidemic.

From December 2010, a new ***meningococcal A*** (**MenAfriVan**) conjugate vaccine is being introduced nationwide in African countries. Highly effective for adults and children, low price and long term protection.

B) Control of patient, contacts and environment:

1. Reporting: class II.
2. Isolation: respiratory isolation, usually at hospital for 24 hours after start R_X.
3. Concurrent disinfection & terminal disinfections.
4. Quarantine: not applicable.

B) Control of patient, contacts and environment: continue

5. Protection of contacts:

- Daily surveillance of house-hold for early sign and symptoms of illness.
- Prophylactic chemotherapy for house contacts, close friends in schools (not all the class), military personnel, young children in day-care. By using **rifampicin** (600mg twice daily for 2 days in adults), or ciprofloxacin (500mg, single dose).
- Generally **immunization** not recommended.

6. Investigation of contacts and source of infection:

throat or nasopharyngeal culture are of no value in investigation for contacts.

7. Specific Rx:

Penicillin in high doses given parenteral is drug of choice; ampicillin and chloramphenicol are also effective.

Treatment should be start as early as possible, even before identification of M.O.

The patient should be given rifampicin prior to discharge from hospital to ensure elimination of the M.O.

C- Epidemic measures:

1) Careful surveillance, early diagnosis, and immediate Rx of suspected cases.
2) Immunization campaign must be implemented for children 2-5 yrs of age if an outbreak occur in large institutional or community setting when group A,C,Y,W-135 are responsible.
3) Reduce overcrowding & ventilating living quarters.
4) Mass chemoprophylaxis is usually not effective in controlling outbreaks, except for small population (e.g. a single school) given to all members at the same time [**sulfadiazine** 0.5 gm children, 1 gm adult twice daily for 2 days]. Rifampicin not recommended as mass Rx.

Haemophilus meningitis

The most common bacterial M. in child

2 months – 5 years before Hib vaccine wide spread.

Infectious agent: ***Haemophilus infuenzae*** **type b (Hib).**

Occurrence: worldwide, 2 months – 3 years, unusual > 5 years.

Reservoir: Humans

6.7.8. I.P and others: same.

9. Method of control:

A) preventive measures:

Vaccines: routine childhood immunization (introduce in Iraq since end of 2011):

1st dose → age 2 months (Hib+DPT+Hb)

2nd dose → age 4 months (Hib+DPT)

3rd dose → age 6 months (Hib+DPT+Hb)

Booster → age 18 months (Hib+DPT)

B) Control of patient, contacts and environment:

5. Protection of house contacts: By using rifampicin.

7. Specific Rx: Ampicillin parenteral is drug of choice, chloramphenicol, ceftriaxone are also effective. The patient should be given rifampicin prior to discharge from hospital.

Pneumococcal meningitis

High CFR, fulminating disease (see Pneumonia).

Vaccination is the mainstay of prevention. In USA pneumococcal vaccine in routinely recommended for < 2 years children.

Neonatal meningitis

Usually in 1st week of life.

CSF etiology: *group B streptococci, Listeria monocytogenes, E. coli K-1 or* other M.O acquired from birth canal.

Rx: Ampicillin + 3rd generation cephalosporin or aminoglycoside.

Viral meningitis

Infectious agent: a variety of viruses [mumps virus in 25% of cases……..]

Recovery usually complete.

Dysentery

Amoebic

Bacillary

	Amoebiasis	Shigellosis
Aetiology:	E. histolytica	Group A: S. dysenteriae 15 sero Group B: S. flexneri 8 Group C: S. boydii 20 Group D: S. sonnei 1
Dx:	**GSE** Cyst or Trophozoid and RBC inside (fresh stool)	microorganism
Infectious dose:	large no.	Low (10 – 100 S.)
Transmission:	feco-oral (cyst) sexual (oral-anal)	feco-oral (direct, indirect)
Reservoir:	Man	Man
Occurrence:	Young adults rare <5Y., very rare <2Y	2/3 of cases in < 10 years rare < 6 months infants
Epidemics:	Rare (sporadic cases)	Occur in epidemics (*S. dysenteriae-1*)

	Amoebiasis	Shigellosis
I.P:	Variables (days, months, years) usually 2-4 weeks	short 1 – 3 days
Clinical:	chr., not bedridden not toxic, no tensmus	Acute, bedridden, toxemic tensmus, cramp, vomiting
Complication:	amoebic liver abscess, amoboma, anal lesion	*S. dysenteriae-1* → convulsion, toxic megacolon, Haemolytic uremic syndrome&perforation S. flexneri → reactive arthropathy (Reiter syndrome) HLA: B27
CFR:	Low	High in complicated cases (20% in HUS in hospital)

Amoebiasis	Shigellosis
Rx: Flagyl + tetracycline or Tinidazol if abscess → surgery	Self-limiting within 4-7 day Mainly supportive (fluid replacement) Methiprine → ↓duration &severity of disease (ampicillin or ciprodar) Anti-motility is contra indicated
Vaccination: None	No commercial vaccine is available

Prevention
(same as typhoid)

1- Health education
2- Personal hygiene
3- Sanitary disposal of feces

Cancer and Infections

Infectious agents are now recognized as a causes of or risk factor in malignancy diseases

A. Viruses:

DNA viruses

1. **HBV** → hepatocellular Ca.
2. **EBV** → nasopharyngeal Ca., Burkitt's lymphoma and Hodgkin and non-Hodgkin lymphomas.
3. **HPV** (16, 18) → Ca. cervix, vulva and anus.
4. **HHV-8** → Ca. cervix and Kaposi's sarcoma. (Human Herpes-8)

A. Viruses:

RNA viruses

1. **HCV** → hepatocellular Ca.
2. **HIV** → Kaposi's sarcoma and non-Hodgkin lymphomas.
3. **HTLV-1** → lymphatic H malignancy (leukemia/lymphoma). (Human T-cell Lymphotrophic V.)

B. Parasites:

- **Schistosomiasis**

  (S. haematobium) → bladder cancer
  (S. japonicum) → colorectal cancer
  in China

C. Bacterial:

Helicobacter pylori → gastric adenoca.