Bacterial Meningitis Infections 01 Teaching Course

Prof Raad Shakir
Imperial College London
No conflict of Interest

- Meningitis causes 300 000 deaths a year globally and carries a risk
- of epidemics; many cases could be prevented by vaccination.

- Meningitis and sepsis are a major cause of disability, but availability
- and access to care and rehabilitation are weak.

improve diagnosis of meningitis at all levels of care;

- develop and facilitate access to diagnostic assays at all levels of care to increase confirmation of meningitis;

- Increase timely collection and testing of diagnostic lumbar punctures, blood and other specimen samples.

- By 2024, evidence-based guidelines and recommended tools developed on treatment
- and care of bacterial meningitis. by 2026, implemented in 80% of countries.

- By 2028, recommended, quality-assured antimicrobials and supplies for supportive
- care are affordable and accessible in >80% of countries (including all targeted countries).

ABM meningeal signs

- Currently the diagnostic accuracy of meningeal signs in adults with suspected meningitis is poor, with sensitivities ranging from 5% for both Kernig and Brudzinki signs to 30% for nuchal rigidity, defined as inability to flex the neck

Table 1 Recommended cerebrospinal fluid routine studies for acute meningitis AAN 2006

- Opening pressure
- Cell count with differential
- Glucose and protein concentration
- **Gram's stain** and bacterial culture
- India ink and fungal culture
- Viral culture
- Acid fast smear and *M. tuberculosis* culture
- Cryptococcal polysaccharide antigen
- Histoplasma polysaccharide antigen
- Complement fixation antibody titers for *C. immitis*
- Viral-specific IgM antibodies
- Broad range PCR for bacterial nucleic acid
- Bacterial specific PCR
- RT-PCR for enteroviruses
- PCR for West Nile virus RNA
- PCR for HSV-2 DNA
- PCR for EBV DNA
- PCR for HIV-1 RNA
- *CSF Lactate (post neurosurgical bacterial meningitis >4.0mmolL)*

ESCMID

- It is strongly recommended to start antibiotic therapy as soon as possible in acute bacterial meningitis patients. The time period until antibiotics are administered should not exceed 1 hour. Whenever lumbar puncture is delayed, e.g. due to cranial CT, empiric treatment must be started immediately on clinical suspicion, even if the diagnosis has not been established.
-

KEY POINTS

- The epidemiology of bacterial meningitis is regional and highly dynamic, influenced by vaccines, climate, latitude, population movement, viral infections and poverty.
- Serotype/serogroup specific conjugate vaccines are highly effective in preventing meningitis, but serotype replacement is increasing, effectively limiting the impact of conjugate vaccines on disease incidence
- Host and pathogen factors influence clinical outcomes, host genetic susceptibility to poor outcome from pneumococcal meningitis is linked to genes involved in NF-κB signalling and endothelial integrity.
- Dexamethasone improves outcome in pneumococcal meningitis in high-income settings only, new agents targeted on the host response are currently in clinical trials.

ABM References

- 1. Wall EC, Chan JM, Gil E,Heydeman RS. Acute Bacterial meningitis. Curr Opin Neurol, 2021; 34(3): 386-395.
- 2. van de Beek D, Brouwer MC, Koedel U, Wall EC. Community-Acquired bacterial meningitis. Lancet 2021;398:1171-1183.
- 3. van de Beek D et al. ESCMID guideline: diagnosis and treatment of bacterial meningitis 2016. Clin Microbiol infect 2016;22:S37-S62.