

Micro - CNS 1

1. Three organisms, *Streptococcus pneumoniae*, *Neisseria meningitidis*, and *Haemophilus influenzae*, cause the vast majority of cases of bacterial meningitis. What is the MOST important pathogenic component they share?

- a) Protein A
- b) Capsule
- c) Endotoxin
- d) β -Lactamase

2. Which one of the following statements concerning viral meningitis and viral encephalitis is CORRECT?

- a) Herpes simplex virus type 2 is the leading cause of viral meningitis.
- b) Herpes simplex virus type 1 is an important cause of viral encephalitis.
- c) The spinal fluid protein is usually decreased in viral meningitis.
- d) The diagnosis of viral meningitis can be made by using the India ink stain on a sample of spinal fluid.

3. You have made a clinical diagnosis of meningitis in a 50-year-old immunocompromised woman. A latex agglutination test on the spinal fluid for capsular polysaccharide antigen is positive. Of the following organisms, which one is the MOST likely cause?

- a) *Histoplasma capsulatum*
- b) *Cryptococcus neoformans*
- c) *Aspergillus fumigatus*
- d) *Candida albicans*

4. Your patient is a 20-year-old woman with the sudden onset of fever to 104°F and a severe headache. Physical examination reveals nuchal rigidity. You suspect meningitis and do a spinal tap. Gram stain of the spinal fluid reveals many neutrophils and many gram-negative diplococci. Of the following bacteria, which one is MOST likely to be the cause?

- a) *Haemophilus influenzae*
- b) *Neisseria meningitidis*
- c) *Streptococcus pneumoniae*
- d) *Pseudomonas aeruginosa*

5. Your patient is a 10-year-old boy who is receiving chemotherapy for acute leukemia. He develops fever, headache, and a stiff neck, and you make a presumptive diagnosis of meningitis and do a lumbar puncture. A Gram stain reveals a small gram-positive rod, and culture of the spinal fluid grows a β -hemolytic colony on blood agar. Regarding this organism, which one of the following is MOST accurate?

- a) It has more than 100 serologic types.
- b) It produces an exotoxin that inhibits elongation factor-2.
- c) It is commonly acquired by eating unpasteurized dairy products.
- d) There is a toxoid vaccine available against this organism.

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6. Your patient is a 25-year-old man who is HIV antibody positive and has a CD4 count of 120 cells (normal, 1000–1500). He has had a mild headache for the past week and vomited once yesterday. On physical examination, he has a temperature of 38°C and mild nuchal rigidity but no papilledema. The rest of the physical examination is negative. Of the following, which one is the MOST likely to be found on examination of the spinal fluid?

- a) Lymphs and gram-positive cocci resembling *Streptococcus pneumoniae*
- b) Lymphs and budding yeasts resembling *Cryptococcus neoformans*
- c) Polys and anaerobic gram-negative rods resembling *Bacteroides fragilis*
- d) Polys and septate hyphae resembling *Aspergillus fumigatus*

7. Your patient is a 7-year-old boy with fever, two episodes of vomiting, and a severe headache that began this morning. He has no diarrhea. On physical examination, his temperature is 39°C, and nuchal rigidity is found. Examination of the spinal fluid revealed a white cell count of 800, of which 90% were lymphs, and a normal concentration of both protein and glucose. A Gram stain of the spinal fluid revealed no bacteria. Of the following, which one is the MOST likely to cause this infection?

- a) *Chlamydia trachomatis*
- b) *Mycobacterium avium-intracellulare*
- c) Coxsackie virus
- d) Adenovirus

8. Your patient is a 50-year-old woman who has a community acquired pneumonia caused by *Streptococcus pneumoniae*. Antibiotic susceptibility tests reveal an MIC of less than 0.1 mg/mL to penicillin G. Which one of the following is the best antibiotic to treat the infection?

- a) Clindamycin
- b) Gentamicin
- c) Metronidazole or doxycycline
- d) Penicillin G or levofloxacin
- e) Vancomycin

9. Your patient is a 40-year-old woman with diplopia and other signs of cranial nerve weakness. History reveals she grows her own vegetables and likes to preserve them in jars that she prepares at home. She is fond of her preserved string beans, which is what she ate uncooked in a salad for dinner last night. Which one of the following is the most likely cause of this clinical picture?

- a) *Bacillus anthracis*
- b) *Clostridium botulinum*
- c) *Clostridium perfringens*
- d) *Clostridium tetani*
- e) *Listeria monocytogenes*

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10. Your patient is a 75-year-old woman with a 110 pack-year history of cigarette smoking who now has a fever of 39°C and a cough productive of yellowish sputum. Gram stain of the sputum shows small gram-negative rods. There is no growth on blood agar, but colonies do grow on chocolate agar supplemented with hemin and NAD. Which one of the following bacteria is the most likely cause of her pneumonia?

- a) *Bordetella pertussis*
- b) *Haemophilus influenzae*
- c) *Klebsiella pneumoniae*
- d) *Legionella pneumophila*
- e) *Pseudomonas aeruginosa*

11. A 35-year-old man who is human immunodeficiency virus (HIV) antibody positive has had a persistent headache and a low grade fever (temperature, 100°F) for the past 2 weeks. See budding yeasts with a wide capsule in India ink preparation of spinal fluid.

Diagnosis: Meningitis caused by *Cryptococcus neoformans*. The latex agglutination test, which detects the capsular polysaccharide antigen of *Cryptococcus* in the spinal fluid, is a more sensitive and specific test than is the test with India ink. See page xx for additional information. If acid-fast rods are seen in spinal fluid, think *Mycobacterium tuberculosis*.

12. A 20-year-old man has a severe headache and vomiting that began yesterday. He is now confused. On examination, his temperature is 39°C and his neck is stiff. Spinal fluid reveals no bacteria on Gram stain, 25 lymphs, normal protein, and normal glucose. Culture of the spinal fluid on blood agar shows no bacterial colonies.

Diagnosis: Viral meningitis, which is most often caused by Coxsackie virus. Can isolate the virus from spinal fluid.

13. A 45-year-old man sustained a skull fracture in an automobile accident. The following day, he noted clear fluid dripping from his nose, but he did not notify the hospital personnel. The following day, he spiked a fever to 39°C and complained of a severe headache. Nuchal rigidity was found on physical examination. Spinal fluid analysis revealed a WBC count of 5200/μL, 90% of which were neutrophils. Gram stain showed gram-positive diplococci.

Diagnosis: Meningitis caused by *Streptococcus pneumoniae*. Patients with a fracture of the cribriform plate who leak spinal fluid into the nose are predisposed to meningitis by this organism. Pneumococci can colonize the nasal mucosa and enter the subarachnoid space through the fractured cribriform plate.