Lecture 4

Fungal infections of the CNS

- Additional Notes
- Important
- Explanation
- Examples

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Fungal infections of CNS

- CNS infections are both diagnostic challenge and medical emergency.
- Delay in diagnosis will lead to high mortality rate and severe neurological damage.
- Fungal infections of the CNS are not common. However they are being increasingly diagnosed nowadays. Because of the increase in number of patients with Cancer and AIDS.
- Almost all CNS fungal infection occur in immunocompromised patients. Very rare to be seen in normal people.
- Risk Factors:
  - ✓ HIV/AIDS
  - ✓ Hematopoietic stem cell transplant
  - ✓ Solid organ transplantation "because they give immunosuppressant drugs"
  - ✓ Malignancies
  - ✓ Neutropenia
  - ✓ Hereditary immune defects
  - ✓ Immunosuppressive medications
  - ✓ Diabetes mellitus
  - ✓ Surgery or trauma
  - ✓ Indwelling catheters (e.g. candidemia → CNS seeding)

- Mechanisms of spread in CNS:
  - ✓ Hematogenously
  - ✓ Local extension from paranasal sinuses, the ear or the orbits
  - ✓ Traumatic introduction such as: surgical procedures, head trauma, injections and lumbar puntures.
- Clinical syndromes: meningitis, brain abscess. It may be seen both in one patients, depends on the pathogen.
- Etiology:
  - ✓ Yeast
    - Candida spp, Cryptococcus spp
  - ✓ Dimporphic "usually starts as respiratory infection → blood stream → CNS"
    - Histoplasma spp, Blastomyces spp, Coccidioides spp
  - ✓ Mould "usually cause brain abscess"
    - Aspergillus spp, Zygomycetes, Rhinocladiella mackinziei

CNS infection	Predisposing Factor	Clinical features	Etiology	Direct Microscopy	treatment
Cryptococcal meningitis	AIDS (HIV)	Mainly meningitis	Cryptococcus neoformans	Capsulated yeast cells **(use india ink to detect it)**	**Amphotericin B** with Flucytosine
Candidiasis	Hospital acquired (mostly caused by indwelling catheters)	Cerebral abscesses And\or Meningitis (hematogenous spread mostly)	Candida Albicans	Pseudohyphae	Caspofungin, Fluconazole, Voriconazole, **Amphotericin B**
Aspergillosis	**Transplantation** Cancer chemotherapy	Brain abscesses	Aspergillus Fumigatus	Septate branching hyphae	**Voriconazole**
Zygomycosis	**Diabetics with ketoacidosis and abnormal eye movement**	Facial Edema, pain necrosis, black discharge	Rhizopus	Broad non septate hyphae	**Amphotericin B**
Pheohyphomycosis	There is not, it could affect normal people "Immunocompetent"	Chronic Brain abscess	**Rhinocladiella mackenziei**	Brown septate hyphae	There is no treatment until now, all the patients died

Quiz

1.Which one of the following fungal infections is common in diabetes:

a) Aspergillosis b) Pheohyphomycosis c) Zygomycosis

2.Which one of the following has no treatment:

a) Candidiasis b) Phehyphomycosis c) Cryptococcal meningitis

3.Which one of the following is the drug of choice of Aspergillosis:

a) Voriconazole b) Flucytosine c) Amphotericin B

ANSWERS: 1.C 2.B 3.A

Quiz

ANSWERS: 4.C 5.A

4.An HIV patient came to the clinic with meningitis. Direct microscopy shows yeast capsulated cells by the use of india ink. What is the most common causative organism :

a) Candida albicans b) Rhinocladiella mackenziei c) Cryptococcus neoformans

5.An immunocompestent host came to the clinic with chronic brain abscess. Direct microscopy showed brown septate hyphae. Which one of the following is the most common causative organism:

a) Rhinocladiella mackenziei b) Zygomycetes c) Rhizopus