Fungal Infections – Lecture Summary

- How do they get transmitted ?

- by inhalation of spores (airborne) or through the oral route (aspiration) or by septicemia or by VAP

- Etiology:

Yeast	Mould Fungi	Dimorphic Fungi
opportunistic		Primary infectious
Candida → Candidiasis	zygomycetes (like rhizopus and mucor) → zygomycosis	Histoplasma capsulatum
cryptococcus neoformans and gattii → cryptococcosis		Blastomyces dermatitidis
	Aspergillus species → Aspergillosis	Paracoccidioides brasiliensis
		Coccidioides immitis

1-Primary Systemic Mycoses:

- Infections that occur by inhalation that may disseminate in immunocompromised patients from the lungs to other organs.

- Caused by dimorphic fungi which are found in soil.

- Highly infectious, and they're primary pathogens.

2-Aspergillosis:

It is a large spectrum of diseases in humans and animals, caused by members of the genus *Aspergillus* of mould fungi (opportunistic).

- These diseases include:

- Mycotoxicosis.-
- Allergy usually type 2 hypersensitivity and may be type 1.
- Colonization (without invasion and extension) in body cavities.
- Systemic and disseminated disease

- Risk factors:

AIDS, Bone marrow or organ transplantations,Cancers, Drugs,Diabetes .. etc

- Etiology:

Aspergillus species, the most common of them are:

Aspergillus fumigatus	Aspergillus flavus.	Aspergillus terreus.
	Aspergillus niger.	Aspergillus nidulans

- classification:

Chronic Aspergillosis : "colonizing aspergillosis"	Invasive pulmonary Aspergillosis:	Allergic bronchopulmonary (ABPA):
.- **Causes** Aspergilloma, which is also known as aspergillus fungus ball. **-Signs include:** Cough, hemoptysis, variable fever. **Radiology** will show a mass in the lung, radiolucent crescent.	**Signs include:** cough, hemoptysis, fever, leukocytosis. **Radiology** will show lesions with a halo sign	- **Symptoms:** asthma, bronchia obstruction, wheezing, fever, malaise, eosinophilia. **-Laboratory findings:** 1-Skin test reactivity to 2-Aspergillus. 3-Serum antibodies to Aspergillus. 4-Serum IgE > 1000 ng/ml. Pulmonary infiltrates.

- Treatment:

Antifungal: Voriconazole.

Alternative therapy: Amphotericin B, Itraconazole, Caspofu

- Diagnosis:

Specimen:	Laboratory Investigations:	Serology:	PCR:
- Respiratory specimens Sputum, BAL, Lung biopsy. -Other samples → Blood.	1-Direct Microscopy. -Will show fungal septate hyphae. -Giemsa Stain or Grocott methenamine silver stain (GMS). 2- Culture on SDA.	-Test for Antibodies. - ELISA test for galactomannan Antigen	Detection of Aspergillus DNA in clinical samples

- Fungal sinusitis:

Cause:	Diagnosis:	Treatment:
Caused by Aspergillus and other fungi which Occur In immunocompromised patients	-Clinical examination and radiological tests. -Culture. - Precipitating antibodies. - Measurement of IgE level. RAST test.	**depends on**: -the type and severity of the disease. - Immunological status of the patient

3) Zygomycosis	4) Pneumocystis
Acute disease ◄ **Features include:** Consolidation, Nodules, pleural effusion, hemoptysis ◄ Infection may extend to chest wall, diaphragm and pericardium **causing**: -Pulmonary Infarctions and hemorrhage -Rapid evolving clinical course **It is Divided into:** -Pulmonary zygomycosis. -Rhinocerebral zygomycosis.	-It's interstitial pneumonia of alveolar area -Affect immuno-compromised patients, especially AIDS patient.
Etiology: - Zygomycetes. - Non-septate hyphae. e.g. Rhizopus	**Etiology:** *Pneumocystis jiroveci.*
Diagnosis: ● **Specimen:** -Respiratory specimens → Sputum, BAL, Lung biopsy.	**Diagnosis:** Does not grow in laboratory media, like SDA for example. ● Specimen: Bronchoscopic

• **Laboratory Investigations:** 1. Direct Microscopy: -Giemsa, Grocott methenamine silver stain (GMS). - Will show broad non-septate fungal hyphae. 2) Culture on SDA: No cycloheximide. • **- Serology:** Not available.	specimens (BAL), Sputum, Lung biopsy tissue. • Histological sections or smears stained by: • GMS stain. • Immunofluorescence (better sensitivity). • If positive, will see cysts that are hat-shaped, cup-shaped, or crescent.
Treatment: • Amphotericin B. • Surgery.	**Treatment:** • Trimethoprim + Sulfamethoxazole. • Dapsone.