

**Name**

**Muhammad Ilyas khan**

**ID Number 14483**

**BS MLT 4<sup>th</sup> semester**

**Clinical Mycology and parasitology**

## Mid-Term Assignment (spring -2020) (BS. MLT 4th)

Course Title: Clinical mycology and parasitology      Instructor: Ms. Huma Imtiaz

**Q1: A 45 years old man, Sikandar is presented to the local hospital having an allergic attack just like asthma. Upon investigations of chest X-ray, fungus balls were seen that changed its position when the patient is moved from an erect to a supine position. What according to you is the possible diagnosis for this condition? What is the causative agent which causes the condition?**

**Disease:** Aspergillus species, particularly Aspergillus fumigatus, cause infections of the skin, eyes, ears, and other organs; "fungus ball" in the lungs; and allergic bronchopulmonary aspergillosis

### **Diagnosis and testing of Aspergillosis**

Diagnosing an Aspergilloma or invasive Aspergillosis can be challenging. Aspergillus is common in all environments but difficult to differentiate from certain other kinds under the microscope. The indicators of Aspergillosis are also similar to those of other lung circumstances such as tuberculosis.

Your doctor is likely to use one or more of the subsequent tests to determine the cause of your symptoms:

**Imaging test.** A chest X-ray or computerized tomography (CT) scan — a type of X-ray that produces more-detailed imageries than conventional X-rays do — can usually disclose a fungal mass (Aspergilloma), as well as typical signs of invasive Aspergillosis and allergic Broncho pulmonary Aspergillosis.

**Respiratory secretion (sputum) test.** In this test, a sample of your sputum is tainted with a dye and tested for the occurrence of Aspergillus filaments. The specimen is then positioned in a culture that inspires the mold to develop to help confirm the diagnosis.

**Tissue and blood tests.** Skin testing, as well as sputum and blood tests, may be useful in checking allergic Broncho pulmonary Aspergillosis. For the skin test, a small amount of Aspergillus antigen is inserted into the skin of your forearm. If your blood has antibodies to the mold, you'll develop a tough, red bump at the injection site. Blood tests look for high levels of certain antibodies, representing an allergic reaction.

**Biopsy.** In some cases, examining a sample of tissue from your lungs or sinuses under a microscope could also be necessary to verify a diagnosis of invasive Aspergillosis.

### **Causative agent which causes the condition**

#### **Aspergillus fumigatus**

Aspergillus fumigatus may be a fungus of the Aspergillus, and is one among the foremost common Aspergillus species to cause disease in individuals with an immunodeficiency. A.fumigatus, a saprotrophic widespread in nature, is usually found in soil and decaying organic matter, where it plays an important role in carbon and nitrogen recycling. fumigatus may be a well-known pathogenic fungus that's liable for quite 80% of aspergillosis, especially in immunocompromised patients.

**Q2: Discuss the following:**

• **Definitive host**

“The organism throughout which the grownup or sexually mature period of the parasite lives”. The host during which the parasite drives over its sexual cycle (i.e., fertilization & meiosis). E.g, mosquitoes function definitive hosts of the plasmodium

(Plasmodium spp.) E.g., snakes (~30 species) function definitive hosts of *Sarcocystis singaporensis*, a disease of mammals.

• **Intermediate host**

“The organism during which the parasite lives during a period of its development only”. Host during which the parasite duplicates but doesn't undergo its sexual cycle. E.g., mammals, including humans, function intermediate hosts of the plasmodium (Plasmodium spp.) E.g., mammals (~30 species, including humans) purpose intermediate hosts of *Sarcocystis singaporensis*. *singaporensis* have been proposed as biological control of rodents pests — apparently it can selectively kill them!

• **Vector**

“A living carrier (e.g.an arthropod) that carries a pathogenic organism from an infected to a non-infected host”. A typical example is that the female *Anopheles* mosquito that transmits malaria”

A Vector may be a living organism that transmits a disease-causing organism to new Hosts. This difference is often arbitrary, however, counting on which organism's infection we are most anxious with. Thus, the *Anopheles* mosquito may be a vector for the parasitic disease malaria because we care extra about the health of the human host than that of the mosquito, however, furthermore, the plasmodium structures a much greater influence on the health of the human host than it does on the health of the mosquito vector.

### **Q3: Explain the transmission and life cycle of plasmodium in your own words.**

#### **Transmission:**

Malaria is transmitted primarily by mosquito bites, but transmission across the placenta, in blood transfusions, and by intravenous substance abuse also occurs

#### **Life Cycle**

The vector and host for plasmodia is that the female Anopheles mosquito. There are two phases within the life cycle: the sexual cycle, which occurs primarily in mosquitoes, and therefore the asexual cycle, which occurs in humans, the intermediate hosts. The sexual cycle is named sporogony because sporozoites are produced, and therefore the asexual cycle is named schizogony because schizonts are made.

The life cycle in humans begins with the introduction of sporozoites into the blood from the saliva of the biting mosquito. The sporozoites are taken up by hepatocytes within a half-hour. This "exoerythrocytic" phase contains of cell development and differentiation into merozoites. Merozoites are released from the liver cells and infect red blood cells.

During the erythrocytic phase, the organism differentiates into a ring-shaped trophozoite. The ring form grows and then differentiates into a schizont filled with merozoites. After release, the merozoites infect other erythrocytes this cycle within the red blood corpuscle repeats at regular intervals typical for every species. The periodic release of merozoites causes the standard recurrent symptoms of chills, fever, and sweats seen in malaria patients.

The cycle begins in the human red blood cells when some merozoites develop into male and others into female gametocytes. The gametocyte-containing red blood cells are consumed by the female Anopheles mosquito and, within her gut, harvest a female macrogamete and eight sperm-like male microgametes. After fertilization, the diploid zygote differentiates into a motile ookinete that penetrates into the intestine wall, where it develops into an oocyst within which many haploid sporozoites are produced

The sporozoites are released and migrate to the salivary glands, able to complete the cycle when the mosquito takes her next feed.