**Histoplasma capsulatum**

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**Disease name:** Histoplasmosis (Also known as Darling’s Disease) (21)

**Etiologic Agent:** *Histoplasma capsulatum*. (16) There are 3 variants of *H. capsulatum*; *H. capsulatum* var. *capsulatum* and *H. capsulatum* var. *farciminosum*, which are both pathogenic to humans, and *H. capsulatum* var. *duboissii*, which is pathogenic to equines (5, 20) Infection by the fungus *H. capsulatum* results in the disease Histoplasmosis (1,2,3,4)

**Means of Transmission:** Transmission of *H. capsulatum* occurs with inhalation of the micronidia spores. (1,13) Can also be transmitted via contact with mucosa or non-intact skin. (16)

**Reservoirs:** Histoplasmosis primary reservoir is nitrogen rich soils with a pH ranging between 5-10. (1) Increased levels of *H. capsulatum* occurs when bird’s or bat’s droppings are found in soils as well; the droppings increase the levels of nitrogen in the soil. (14) Old chicken houses, bat caves and pigeon, blackbird and starling roosts are common places to find *H. capsulatum*. (27)

**General Characteristics:** *H. capsulatum* is a dimorphic fungus found in the environment in a filamentous mould form. (1, 16) Can be cultured using general fungal media in conditions below 35°C. (16)

**Key Tests:** *H. capsulatum* can be detected using Giema and Wright’s stain of blood and bone marrow samples. (1) Grocott-Gomori methenamine silver and periodic acid-Schiff stains are also used with pulmonary alveolar lavage fluid and tissue samples. (16) Histoplasma polysaccharide antigen test, nested PCR for unique proteins, real time PCR for bone marrow samples and serological test are other means of identifying *H. capsulatum*. (16)

**History:** *H. capsulatum* was first described by Dr. Samuel Darling, an American physician working in the Canal Zone in Panama in 1906. (17) However it took years to prove that *H. capsulatum* was a dimorphic fungus, found in soil and that it was primarily a pulmonary disease. (18,19)

**Signs and symptoms:** A *H. capsulatum* infection manifest typically as a pulmonary infection. (16) A mild case of *H. capsulatum* typically is transient which has no signs or symptoms. (16,22) However along with being asymptomatic, *H. capsulatum can* present as many other clinical forms. (6) Acute and chronic pulmonary infection, acute or chronic disseminated, which a severe case of *H. capsulatum*, occurs in immunocompromised patients, mediastinitis, meningitis, osteomyelitis and cutaneous infections (6,22) Disseminated histoplasmosis can affect any part of the body and if left untreated it is usually fatal. (7,22) When signs and symptoms that do occur, with either a mild or sever case, they usually do not appear until 3-17 days after expose to *H. capsulatum*. (22) Headaches, muscle aches, chills, fever, dry cough and
chest discomfort are some typical signs and symptoms. (22) Rash and joint pain can occur as well. (22) Weight loss and coughing up blood are symptoms of chronic histoplasmosis and typically occur in people with underlying lung disease. (22). It has been found that if a patient who has had their H. capsulatum infection under control can still have it reactivated if they become immunosuppressed. (8)

Virulence: The characterized virulence determinants of H. capsulatum are for the most part surface expressed molecules that intervene the interaction between the fungus and the host’s immune cells which permits the pathogen to evade destruction by natural immune response and encourage the replication of the yeast in its new surroundings. (23)

Treatment: Mild cases of H. capsulatum typically do not need any treatment but if some symptoms do occur the infection can be treated using itraconazole, an antifungal medication for up to 12 weeks. (16) Severe infections both amphotericin B, another antifungal, and itraconazole are used. (7,13) Acute histoplasmosis antifungal regime in IV amphotericin for 1-2 weeks, then itraconazole for 3 days. (15)

Prevention: There is no immunizations or prophylaxis available for H. capsulatum at this time. (16) Avoiding areas with bird and bat droppings is one way to prevent exposure to H. capsulatum. (25) Areas where the fungus is common, prevention is unfortunately impossible. (24) Central and eastern states, mainly Ohio and Mississippi River valleys are prime locations to find H. capsulatum. (25) H. capsulatum also can be found in parts of South and Central America as well as Africa, Asia and Australia. (25) Respirator face mask can help with workers that are in contaminated areas. (24) Also spraying water on soil before working in it can help prevent spores from be released into the air. (24) Previous infection of H. capsulatum does provide some protection from having a severe case if reinfection occurs, but does not provide immunity. (24)

Outbreaks: In 2013 there was an outbreak of H. capsulatum in an Illinois state prison during the month of August and September. (26) 78 prisoners were infected and was thought to have been caused when some contaminated soil was disrupted on the prison grounds. (26) In 2015 dozens of workers in the Dominican Republic became infected with H. capsulatum after working in the Taveras Dam in the Santiago province. (27) They were believed to have become infected while cleaning a pipe vent that serves the dam. (27) During this outbreak there was 3 fatalities. (27) It has been found that during outbreaks in general, exposure to infected dust and soil for prolonged periods of time as well as the disruption of the contaminated soil increase the risk of localized outbreaks (9) After the general population around Ohio and Mississippi River areas were tested, 80% were found to have hypersensitivity to H. capsulatum, majority being young adults. (10,11)

Works Cited


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