Blastomycosis is no blast - Transcript - Podcast #2

GG: Hello and welcome to our 2nd podcast of Think Blasto!
I am Dr. Greg Gauthier, an infectious diseases specialist at the University of Wisconsin.

JM: Yes, welcome to Think Blasto! I am Dr. Joseph McBride, an infectious diseases specialist at the University of Wisconsin. This podcast series is designed to describe and outline a disease that is more common in Wisconsin than in most parts of the world, an infection called blastomycosis.

GG: The title of today's podcast is "Blastomycosis is no Blast" and we learn a bit more about where blastomycosis occurs and the symptoms of blastomycosis.

JM: Greg, I know when I close my eyes and think about blastomycosis, images of a rural landscape are generated. I think of hikers and hunters exploring beaver dams, I imagine kayakers and canoers trudging on wet riverbanks, and I think of big long deep breaths of crisp country air that might contain just the smallest about of aerosolized fungus. Just how accurate is this picture?

GG: While it is true that blastomycosis is an infection that is acquired in the woods or in rural areas of the state; blastomycosis can also occur in people who have never ventured into the woods or been involved with recreational water sports.

JM: Can the infection be acquired in smaller towns, suburbs, or even urban settings such as Milwaukee or Indianapolis?

GG: In both rural and urban areas, blastomycosis can occur sporadically or as an outbreak. What I mean by sporadically, is that 1 person in an area has blastomycosis. In contrast, an outbreak usually involves multiple people in an area becoming infected around the same time. There have been at least 20 outbreaks of blastomycosis in the United States since 1953. The first outbreak occurred in North Carolina. Other states with outbreaks include Minnesota, Wisconsin, Illinois, Indiana, Tennessee, and Virginia. There was even an unusual outbreak in Colorado involving a few people that was associated with prairie dog relocation.

JM: What can these outbreaks tell us?

GG: We have learned a lot from outbreak studies including how infection from *Blastomyces* can be acquired. Blastomycosis outbreaks in Indianapolis, Indiana and Westmont, Illinois were associated with nearby road construction. Other construction projects such as building a factory in TN and new house construction in MN also caused outbreaks of blastomycosis. In Wisconsin, there was an unusual outbreak in 2006 associated with a community compost pile. In rural areas, outbreaks have also been associated with construction projects as well as hunting, fishing and watersports. What these outbreaks all have in common is soil disruption.

JM: In a previous podcast, we talked about how *Blastomyces* lives in sandy soil in forested areas that have decaying vegetation and are nearby water. That description doesn't sound especially common in an urban environment. Could you tell a bit about how persons living in urban areas might be exposed to and breath in *Blastomyces* spores?

GG: Joe you are right. In Milwaukee county in Wisconsin, there are not a lot of sandy soils, but there are different types of bodies of water. A study published in 2006 demonstrated that persons with blastomycosis in Milwaukee county lived closer to open watersheds compared to urbanized watersheds. An open watersheds include ponds, streams and rivers with surrounding dirt. In contrast, an urbanized watershed would a river or stream that runs underground or has had its shoreline replaced with concrete. Based on this research, *Blastomyces* in an urban area is thought to live in the dirt near freshwater.

JM: From our first podcast, we learned that Wisconsin is a hotbed for blastomycosis, that anyone is at risk for blastomycosis, but only about half the people who breath in *Blastomyces* spores will develop symptomatic infection.

GG: Joe, How long does it takes from inhalation of *Blastomyces* spores until people develop symptoms of blastomycosis?

JM: Well Greg, the question regarding the timeframe between inhaling spores to symptom onset is called the incubation period. And for blastomycosis the incubation period can be quite long. It ranges from 3 weeks to 3 months. The incubation period for blastomycosis was figured out right here in Wisconsin during the investigation of outbreaks associated with a beaver dam along the Eagle River in Vilas County as well as outbreaks associated with the Tomorrow River in Portage County, and the Crystal River in Waupaca County.

GG: Because there is such a long incubation period, 3 weeks to 3 months, could a person could develop symptoms anytime of the year?

JM: Yes, that is correct. After exposure, patients can develop symptoms any time of the year - winter, spring, summer and fall. Greg, what sort of symptoms do we think about with blastomycosis?

GG: Well, that's a really good question and bit challenging to answer because *Blastomyces* is known as the "great pretender", which means it can mimic other diseases such as bacterial pneumonia, tuberculosis, and even cancer.

JM: Given that blastomycosis can mimic many other diseases, what is the most common way it presents?

GG: Most commonly, blastomycosis presents as a respiratory illness that results in a lung infection known as pneumonia. In fact, about 70 – 90% of persons with symptomatic blastomycosis will have symptoms involving the lungs.

JM: What sort of symptoms do people experience when their lungs are infected with blastomycosis?

GG: Most commonly fevers, chills, cough, shortness of breath, chest pain, fatigue and decreased appetite. The cough can be dry or productive. A dry cough means that no sputum is coughed up. A productive cough means sputum is produced with coughing. Rarely, blastomycosis can result in coughing up blood. Patients often have symptoms for several weeks.

JM: These symptoms sound a lot like bacterial pneumonia, which is pneumonia caused by bacteria. However, blastomycosis is caused by a fungus and not a bacterium. Is there a way for health care providers to distinguish between blastomycosis and bacterial pneumonia by clinical symptoms or x-ray imaging of the lungs?

GG: No there is not. Symptoms and x-ray findings of pneumonia due to bacteria and blastomycosis are very similar. The only way to determine if a patient has blastomycosis is to specifically test for it, which will talk about in detail in a later podcast.

JM: You indicated that patients with pneumonia due to blastomycosis typically have symptoms for several weeks, can some patients have symptoms for several months?

GG: Yes, if blastomycosis is not diagnosed early, it can result in what is known as a chronic pneumonia in which a person has progressive symptoms for months. Symptoms of chronic blastomycosis pneumonia include fevers, chills, night sweats, productive or non-productive cough, shortness of breath, chest pain, weight loss, fatigue, and rarely coughing up blood. On x-ray imaging, patients with chronic blastomycosis often have what is known as cavitary pneumonia, in which *Blastomyces* infection causes the lung tissue to become injured; this injury causes a hole to be formed in the lungs, which in medical terms we call a cavity. A cavity just means an empty space within an organ or solid structure. Blastomycosis that causes a cavity in the lungs can look exactly like tuberculosis, which is caused by a special type of bacteria called *Mycobacterium tuberculosis*. When people with cavitary blastomycosis pneumonia are treated with antifungals, the cavity gets smaller, eventually resolves, and forms a scar in the lung. Fortunately, the scar does not generally cause long term problems with breathing.

JM: In a small percentage of patients, blastomycosis can be severe enough to cause respiratory failure that requires the patient being put on a ventilator to help them breath. In this situation, the infection often involves both lungs. This severe pneumonia can result in a condition known in medical terms known as acute respiratory distress syndrome, also known ARDS. A is for acute, R is for respiratory, D is for distress, S is for syndrome. There are many causes of ARDS and blastomycosis happens to one of the causes.

GG: We mentioned that it can be difficult to distinguish blastomycosis from bacteria that cause pneumonia. Joe, are there certain clues that suggest that a pneumonia could be due to a fungus and not bacteria?

JM: Great question, yes there are 4 big clues that suggest fungal pneumonia. The first clue is a history of soil or water exposure in an area in which *Blastomyces* grows. A second clue is a pneumonia does not get better while on antibiotics. Antibiotics kill bacteria, not fungi. Often people receive 2 or 3 courses of antibiotics before fungal pneumonia such as blastomycosis is considered. A third clue is blastomycosis infection that has spread from the lung to other organs. This is known as disseminated blastomycosis and it occurs 15 – 48% of patients. The most common site of disseminated blastomycosis is the skin. Thus, blastomycosis should be thought about in patients with pneumonia with new skin lesions. A fourth clue would be severe pneumonia that requires care in the intensive care unit or ICU. Thus, it is important to Think Blasto in a person with pneumonia that does not getter on antibiotics, pneumonia with new skin lesions, or severe pneumonia that requires care in the intensive unit.

GG: You mentioned that blastomycosis can cause skin lesions, what do they look like?

JM: These skin lesions can have different appearances. They can be red and flat, they can be raised nodules that are tender, or painful ulcers, and even cauliflower-like lesions. The skin lesions of blastomycosis get slowly larger and typically do not heal on their own or with special wound care treatments. They require antifungal therapy to heal. Skin biopsy along with culture can help establish the diagnosis of *Blastomyces* skin infection.

GG: In addition to spreading to the skin, are there other organs that *Blastomyces* can spread or disseminate to?

JM: Although the skin is the most common site of disseminated infection, other organs can be infected to. The 2nd most common site of disseminated blastomcyosis is the bone. Any bone can be affected including bones of arm, leg and even the spine. Infection of the bone is painful. At times, the skin overlying the bone can be red and even drain pus. An uncommon site of infection is the prostate, which occurs in 5-10% of patients and can mimic symptoms of bacterial prostatitis. In less than 5-10% of patients, *Blastomyces* can cause meningitis or a brain abscess. Patients with meningitis typically have headache, fever, and confusion. Similar symptoms can occur with brain abscess as well as seizures or loss function of an arm or a leg due to the abscess compressing brain structures. The vast majority of patients with blastomycosis involving the brain have other sites of blastomycosis infection such as the lungs or the skin.

GG: Can persons have skin lesions due to blastomycosis without symptomatic pneumonia?

JM: It is uncommon, but yes it can occur. In this situation, the infection often starts out as a pneumonia without symptoms and the *Blastomyces* yeast silently spread to the skin to cause tender nodules or ulcers.

GG: Persons with certain conditions such as diabetes can develop ulcers on their feet. Do ulcers from blastomycosis mimic diabetic foot ulcers?

JM: No they do not. Ulcers due to to blastomycosis typically do not involve the feet. Rather they involve other parts of the body such as the face, arms, abdomen, and legs.

GG: Earlier in the podcast, we mentioned that blastomycosis can mimic cancer in addition to other infections. Joe, what sort of cancers can blastomycosis mimic?

JM: On chest x-ray or CAT scan imaging, blastomycosis can look a lot like lung cancer. On a head MRI, blastomycosis can rarely look like a brain tumor. Blastomycosis has even mimicked laryngeal cancer, better known as throat cancer. A biopsy with special stains for fungi and a culture specifically for fungus is required to distinguish blastomycosis from cancer.

GG: So for patients, families, nature lovers, and pet owners, lets summarize what we have learned today:

JM: *Blastomyces* can infect persons living in urban or rural areas.

GG: In both urban and rural areas, outbreaks of blastomycosis have been associated with construction projects

JM: Incubation period of blastomycosis is 3 weeks to 3 months, which means people can develop symptoms of blastomycosis any time of the year

GG: The most common clinical presentation of blastomycosis is pneumonia

JM: Blastomycosis can mimic other lung infections such as bacterial pneumonia and tuberculosis.

GG: Blastomycosis pneumonia can be asymptomatic, cause mild-to-moderate symptoms that result in people seeking medical care, and at times, cause severe respiratory infection that needs to be treated in the intensive care unit.

JM: Clues that suggest fungal pneumonia include: exposure history, pneumonia that does not respond to antibiotics, and pneumonia that spread to other organs such as the skin, bone, or brain.

GG: Patients with severe pneumonia that requires care in the intensive care unit should be tested for blastomycosis if the cause of pneumonia is unknown.

JM: Great, to our audience thank you very much for your time and interest. Greg, I look forward to discussing more aspects of blastomycosis with you in the future.

GG: And until next time, Think Blasto!