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Cryptococcus gattii – An Emerging Infectious Disease in the Pacific Northwest

Background

Cryptococcus gattii (*Cg*) is a fungus that is commonly isolated from the environment in tropical and sub-tropical regions globally. Over the past decade, *Cg* has also been identified in soil and tree samples from temperate coastal climates in the Pacific Northwest. Starting in 1999, public health authorities in British Columbia (BC) began receiving reports of human *Cg* infections among residents of Vancouver Island.¹

In contrast to the more commonly-occurring *Cryptococcus neoformans* infections, *Cg* is more likely to infect patients without HIV infection and to cause cryptococcomas (tumor-like granulomatous lesions), and is less responsive to antifungal drugs.^{2,3} Infection with *Cg* can be asymptomatic or, after an incubation period that can be as long as 13 months, cause a range of symptoms including chest pain, cough (often lasting weeks to months), fever, headache, meningitis, nausea/vomiting, night sweats, shortness of breath, and weight loss. Radiological findings can include brain, lung or muscle cryptococcomas, pulmonary infiltrates, and cavitory lesions. *Cg* is not communicable from person-to-person, and infections have been documented in persons with and without underlying illness. From 1999–2007, 218 cases of *Cg* infection were reported in BC, and 19 people were known to have died of or with *Cg*.² In California, Idaho, Oregon and Washington, 60 infections were reported as of July 1, 2010,³ and 15 people are known to have died of or with *Cg*.

Cryptococcus infection can be detected by serum antigen testing, microscopy of respiratory secretions or cerebrospinal fluid (CSF), or histopathology of affected tissue. To distinguish *Cg* from *C. neoformans*, culture and subtyping must be performed.

Molecular strains of *Cg* found in North America are distinct from those found elsewhere in the world, though the full extent of strain variation is not known.⁴ Research is ongoing to determine the potential relationship between strain types and disease severity. Additionally, because *Cg* appears to have adapted to a new climatic niche in the Pacific Northwest,³ further work is warranted to better understand the potential extent of the organism's ecological range. This will be particularly important for Alaska if our temperature trends continue to rise.⁵

Surveillance for Human Cases in Alaska

While cryptococcosis is not on Alaska's reportable conditions list, unusual incidences of any confirmed or suspected infectious disease are reportable (7 AAC 27.005). Cases of cryptococcosis have been documented in Alaska, although details about the method of diagnosis, specific fungal variant, presence of comorbidities, or travel history were not routinely collected. In 2008, *Cg* infection was confirmed in an Alaska resident who had significant travel to Washington and Oregon.³ To date, there has been no evidence of locally-acquired *Cg* infection in Alaska.

The Alaska State Public Health Laboratory (ASPHL) performs general mycology cultures for fungus and yeast species; however, testing to confirm *Cg* is only available by subsequent referral to a specialized laboratory. The Centers for Disease Control and Prevention (CDC) in Atlanta, GA, routinely accepts both human and animal *Cryptococcus* isolates for speciation and, if *Cg* is confirmed, isolates undergo molecular studies to determine strain type.

Surveillance for Animal Cases in Alaska

To date, *Cg* infections have not been reported in Alaska animals. Elsewhere, *Cg* infections have been confirmed in cats, dogs, horses, llamas, and marine mammals. Clinical symptoms range from sinusitis, granulomatous lesions in the skin and lymph nodes, neurologic symptoms and pneumonia. *Cg* infections in both animals and humans may be underreported in the United States because many cryptococcal isolates are never speciated. In the Pacific Northwest, where surveillance for *Cg* is enhanced, *Cg* cases among animals have occurred at least as frequently as among humans.¹

Environmental Sampling

Most of the environmental sampling for *Cg* in North America has been conducted in British Columbia; however, additional sampling efforts are underway in other locations in the Pacific Northwest where human or animal cases have been identified. *Cg* survives well in certain soils and geoclimatic conditions; however, numerous samples are often needed to confirm the presence of the fungi in a region. In North America, *Cg* has not been detected from environmental samples collected north of Vancouver Island (i.e., 49 degrees north latitude). Changes in regional climatic conditions or the detection of a suspected locally-acquired human or animal case of *Cg* infection may warrant targeted environmental sampling in Alaska in the future.

Recommendations

1. Health care providers should maintain an index of suspicion for *Cg* infection when caring for cryptococcosis patients who are immunocompetent, and elicit a 13-month travel history to evaluate whether the patient has visited *Cg*-endemic areas.
2. Providers should report suspected human cases of *Cg* infection to the Section of Epidemiology at 907-269-8000.
3. Instructions for collecting and submitting specimens to ASPHL for fungal culture are available at: http://www.hss.state.ak.us/dph/labs/publications/image/Lab_Svcs_Manual.pdf. If a sample submitted to an out-of-state laboratory is positive for *Cryptococcus spp.*, the Section of Epidemiology can redirect the sample to CDC for speciation and subtyping.
4. Veterinarians should report suspected *Cg* cases in domestic animals to the Department of Environmental Conservation (DEC), Office of the State Veterinarian at 907-375-8200. Lesions seen in wildlife can be reported to the Alaska Department of Fish & Game wildlife veterinarian, Dr. Kimberlee Beckmen at 907-459-7257. Arrangements can also be made to forward appropriate animal specimens to CDC.

References

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