Cryptococcosis (due to *Cryptococcus Gattii)*

Case Definitions

Nova Scotia Surveillance Guidelines, including case definitions, are found here.

Causative Agent

Cryptococcus gattii is a haploid encapsulated yeast-like fungus. There are over 30 species of *Cryptococcus* however only *C. gattii* and *C. neoformans* are considered human pathogens. Several *C. gattii* genotypes exist (VGI, VGII a,b,c, VGIII, VGIV, VGV, VGVI), which vary by geographic region and virulence.

Source

C. gattii exists in trees and soil and has historically been associated with tropical and subtropical climates; however, *C. gattii* can also be found in temperate regions such as the Pacific Northwest, including British Columbia, where the fungus emerged in the early 2000s. Sporadic cases have been detected in other temperate areas of North America, including Nova Scotia. The reason for the emergence of *C. gattii* in temperate locations remains uncertain. In contrast, the more common *C. neoformans* is distributed worldwide.

Transmission

Transmission occurs through the inhalation of *C. gattii* spores. While illness is rare, humans and animals may become infected, though most people exposed to this fungus will not become ill.

Communicability

There is no animal-to-human transmission. Cryptococcal transmission from donor organ and tissue grafts has been reported, although rare.

Incubation

The incubation period for environmental fungal pathogens is challenging to determine given uncertain exposure timelines. Estimates for *C. gattii* range from 6 weeks to several years, with a median of 6-7 months.

Clinical Presentation

C. gattii infection occurs in both immunocompetent people and individuals with underlying immunocompromising conditions, although prognosis is worse in the latter. This contrasts with *C. neoformans*, which primarily causes infection in immunocompromised individuals. Infections in children are possible, although prevalence is lower than with adults.

Clinical presentation varies by genotype, but infection most often affects the lungs or central nervous system (CNS). Systemic symptoms can include fever, chills, and unintended weight loss.

Respiratory involvement may lead to pneumonia or the formation of cryptococcomas within the lungs. Symptoms include cough, shortness of breath, chest pain, and hemoptysis.

CNS involvement can result in meningitis or cryptococcomas in the brain. Individuals may present with headache, neck stiffness, nausea, confusion, focal neurological deficits, seizures, visual disturbances, and papilledema.

In rare cases, the infection may disseminate to other organs. Illness can be severe, with case fatality rates ranging from 10% to 25%. The VGII genotype is thought to be more virulent than others.

Diagnostic Testing

Culture is the gold standard for diagnosing cryptococcal infection and can be used to differentiate between *C. gattii* and *C. neoformans*.

MALDI-TOF can also distinguish between *C. gattii* and *C. neoformans* from positive cultures.

Rapid detection of cryptococcus using Nucleic Acid Amplification Testing (NAAT) is available as part of the Biofire meningitis/encephalitis panel; however, it does not differentiate between species. Further molecular testing with 18s PCR can help differentiate species when the Biofire panel is positive for cryptococcus *gattii/neoformans*.

Cryptococcal antigen detection in CSF and serum is useful for rapid detection of cryptococcal infection. However, this method identifies the fungus to genus only and does not differentiate between *C. neoformans* and *C. gattii.* The antigen test in Nova Scotia uses a lateral flow assay.

Cryptococcus organisms may also be identified on histopathology.

Treatment

Infectious disease physicians should be consulted. Delay in treatment may lead to worse clinical outcomes. Treatment is outside the scope of public health.

Vaccine

There is no vaccine to prevent cryptococcal disease.

Case Management

The primary purpose of case management is to support ongoing surveillance and better understand the emergence and epidemiology of *C. gattii* in Nova Scotia.

- Contact the case or proxy (e.g., parent/guardian or close relative) to determine symptom onset, medical history, as well as behavioural, recreational, occupational, and travel-related risk factors.
- Review chart/contact the health care provider to determine symptoms and clinical outcomes.

For detailed information on the data collected during case interview, please refer to the Nova Scotia Surveillance Guidelines.

Exclusion

Exclusion is not applicable.

Contact Management

Contact management is not applicable.

Education

C. gattii is an environmental fungus that has been detected in humans in Nova Scotia; however, infections are rare. Not all people exposed to the spores will become ill.

There are no specific preventative measures.

If others with similar exposures (family members, colleagues etc.) are experiencing symptoms, advise that they seek medical assessment.

Smoking and vaping may increase the risk of disease severity.

Outdoor activities are safe and encouraged; infection risk remains very low.

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