

ALPHAVIRUSES

(Equine Encephalitides)

Background:

Venezuelan equine encephalomyelitis, eastern equine encephalomyelitis and western equine encephalomyelitis (VEE, EEE and WEE) are mosquito-borne viral infections found in North and South America. VEE occurs in many areas of South and Central America, and outbreaks have occurred in North America. EEE occurs primarily along the eastern and gulf coasts of the United States and the case-fatality rate can be as high as 50 to 70 percent. WEE viruses are found primarily west of the Mississippi. Outbreaks occur primarily in the summertime. These alphaviruses are limited in their geographic distribution by the mosquito vector, so finding these viruses outside the endemic areas should arouse suspicion of an intentional release. These viruses are considered highly infectious by aerosol. Because they are stable during storage and can be produced in large amounts, they are considered to be agents that are easily weaponized. Reports of ill horses in the vicinity would suggest a natural epidemic, or the release of an equine encephalitis virus.

Signs/Symptoms:

Most infections with these viruses result in nonspecific symptoms of fever, headache and myalgia. Only a fraction of those individuals infected will progress to frank encephalitis. Infants and the elderly are more prone to developing encephalitis.

- 1) CNS: The initial viral prodrome may be followed by confusion and somnolence, which may progress to coma.
 - a) EEE is the most severe of these infections, with high mortality rates and high rates of neurologic sequelae.
 - b) WEE and VEE have lower rates of progression to neurologic symptoms. Peripheral blood counts often reveal a leukopenia in the early stages of illness that can progress to leukocytosis. Cerebrospinal fluid (CSF) protein is elevated, and a lymphocytic pleocytosis is usually present.

It is not known whether aerosol exposure in a BT event would lead to a different pattern of symptoms than the mosquito-borne illness.

Laboratory and Diagnostic Testing:

Contact the local department of health and IDPH for additional instructions for possible Alphavirus-infected patients:

- 1) **Viral culture:** The virus may be isolated from blood during the early stages of illness, but viremia has usually resolved by the time symptoms of encephalitis develop. The virus can sometimes be isolated from CSF viral cultures.
- 2) **Immunoassays:** The viral pathogen may be identified by serology testing of the CSF or serum. Virus-specific IgM antibodies can be detected by ELISA. Subsequent testing of convalescent serum may confirm the diagnosis but will not be helpful in initial management. Physicians should attempt to obtain CSF for specialized testing if encephalitis is a diagnostic possibility. Experimental PCR assays have been developed for several viral pathogens and they may become commercially available in the future.

Treatment:

There is no specific treatment for these viral encephalitides and treatment is supportive.

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Prophylaxis:

- 1) Inactivated vaccines are available for EEE, WEE and VEE. None is in widespread use because of problems with poor immunogenicity and need for multiple doses.
- 2) A live attenuated vaccine is available for VEE but has a high incidence of side effects such as fever, headache and malaise.
- 3) New vaccines using recombinant technology are currently in development.