Norovirus in Healthcare Facilities Fact Sheet

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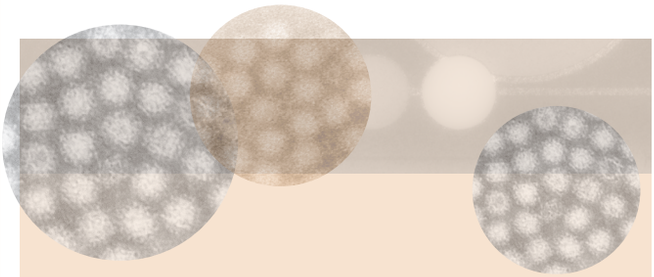

General Information

Virology

Noroviruses (genus Norovirus, family Caliciviridae) are a group of related, single-stranded RNA, non-enveloped viruses that cause acute gastroenteritis in humans. Norovirus was recently approved as the official genus name for the group of viruses provisionally described as "Norwalk-like viruses" (NLV). Currently, human noroviruses belong to one of three norovirus genogroups (GI, GII, or GIV), each of which is further divided into >25 genetic clusters.

Clinical manifestations

The average incubation period for norovirus-associated gastroenteritis is 12 to 48 hours, with a median of approximately 33 hours. Illness is characterized by acute-onset vomiting; watery, non-bloody diarrhea with abdominal cramps, and nausea. In addition, myalgia, malaise, and headache are commonly reported. Low-grade fever is present in about half of cases. Dehydration is the most common complication and may require intravenous replacement fluids. Symptoms usually last 24 to 60 hours. Volunteer studies suggest that up to 30% of infections may be asymptomatic.

Epidemiology of transmission

Noroviruses are highly contagious with as few as 100 virus particles thought to be sufficient to cause infection. Noroviruses are transmitted primarily through the fecal-oral route, either by direct person-toperson spread or fecally contaminated food or water. Noroviruses can also spread via a droplet route from vomitus. These viruses are relatively stable in the environment and can survive freezing and heating to 60°C (140°F). In healthcare facilities, transmission can additionally occur through hand transfer of the virus to the oral mucosa via contact with materials, fomites, and environmental surfaces that have been contaminated with either feces or vomitus.

Diagnosis of norovirus infection

Diagnosis of norovirus infection relies on the detection of viral RNA in the stools of affected persons, by use of reverse transcription-polymerase chain reaction (RT-PCR) assays. This technology is available at CDC and most state public health laboratories and should be considered in the event of outbreaks of gastroenteritis in healthcare facilities. Identification of the virus can be best made from stool specimens taken within 48 to 72 hours after onset of symptoms, although good results can be obtained by using RTPCR on samples taken as long as 7 days after symptom onset. Other methods of diagnosis, usually only available in research settings, include electron microscopy and serologic assays for a rise in titer in paired sera collected at least three weeks apart. Commercial enzyme-linked immunoassays are available but are of relatively low sensitivity, so their use is limited to diagnosis of the etiology of outbreaks. Because of the limited availability of timely and routine laboratory diagnostic methods, a clinical diagnosis of norovirus infection is often used, especially when other agents of gastroentertis have been ruled out.

Measures to Limit Transmission

Isolation precautions

Patients with suspected norovirus infection should be managed with Standard Precautions with careful attention to hand hygiene practices. However, Contact Precautions should be used when caring for diapered or incontinent persons, during outbreaks in a facility, and when there is the possibility of splashes that might lead to contamination of clothing. Persons cleaning areas heavily contaminated with vomitus or feces should wear surgical masks as well. In an outbreak setting, it may be prudent to place patients with suspected norovirus in private rooms or to cohort such patients.

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Environmental disinfection

CDC recommends either chlorine bleach or U.S. Environmental Protection Agency (EPA) approved disinfectants for use in controlling norovirus outbreaks. All disinfectants should be used on clean surfaces for maximum performance. Please see the U.S. Environmental Protection Agency (EPA) website for a list of hospital disinfectants registered by the EPA with specific claims for activity against noroviruses. It should be noted that evidence for efficacy of disinfectants against norovirus are usually based on data of efficacy against feline calicivirus (FCV) as a surrogate for norovirus. However, feline calicivirus (a virus of the respiratory system in cats) has different physio-chemical properties to norovirus and there is debate on how well data on inactivation of FCV reflects efficacy against norovirus.

Chlorine bleach should be applied to hard, non-porous, environmental surfaces at a minimum concentration of 1000 ppm (generally a dilution1 part bleach solution to 50 parts water) This concentration has been demonstrated in the laboratory to be effective against surrogate viruses with properties similar to those of norovirus. Healthcare facility staff should use appropriate PPE (e.g. gloves and goggles) when working with bleach. In areas with high levels of soiling and resistant surfaces, up to 5000 ppm chlorine bleach may be used.

EPA-approved disinfectants should be used according to manufacturers' instructions.

Quaternary ammonium compounds are often used for sanitizing food preparation surfaces or disinfecting large surfaces (e.g., countertops and floors). However, because noroviruses are non-enveloped virus particles, most quaternary ammonium compounds (which act by disrupting viral envelopes) do not have significant activity against them.

Phenolic-based disinfectants have been shown to be active against noroviruses in the laboratory. However, this activity may require concentrations 2- to 4-fold higher than manufacturer recommendations for routine use.

Heat disinfection (i.e., pasteurization to 60°C (140°F)) has been suggested, and used successfully under laboratory conditions, for items that cannot be subjected to chemical disinfectants such as chlorine bleach.

*Note: The use of trade names and commercial sources is for information purposes only and does not constitute endorsement by CDC, the U.S. Public Health Service (PHS), or the Department of Health and Human Services (DHHS).

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