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Norovirus outbreaks in hospitals: epidemiology, diagnosis, management and control.

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Noroviruses (NoV) are single-stranded RNA, non enveloped viruses belonging to the family of the *Caliciviridae* . The genus NoV has been separated in five genogroups, designated GI through GV. Three of these, namely GI, II and IV, are pathogenic to humans. Each genogroup contains several genotypes. A single genotype, GII.4, is associated with the majority of global outbreaks. Within the last years, several NoV outbreaks occurred and were documented in Belgium hospitals.

After an average incubation from 12 to 48 hours, NoV illness is characterized by acute-onset vomiting, watery non-bloody diarrhoea with abdominal cramps, and nausea. Recovery is usually complete after 2 or 3 days. However, more prolonged courses of illness and viruses shedding can occur, particularly among young children, elderly persons and hospitalized patients.

NoV are transmitted primarily through the fecal-oral route, either by direct person-to-person spread or fecally contaminated food or water. NoV can also spread via a droplet route from vomitus.

NoV are now recognized as the leading cause of epidemics of gastroenteritis, and represent an important cause of sporadic gastroenteritis in both children and adults.
The characteristics of NoV facilitate their spread during outbreaks: NoV are highly contagious; these viruses are relatively stable in the environment and can survive freezing and heating to 60°C; shedding may last several week s; carrier may be asymptomatic; no or limited long-term immunity results from infection.

Diagnosis of NoV 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. Sequencing of NoV strains found in clinical and environmental samples greatly helps in conducting epidemiologic investigations.
Commercial enzyme-linked immunoassays detecting NoV antigen currently exhibit inadequate sensitivity (<50%) to be useful for diagnosis of sporadic cases. However, in outbreak settings, these tests may be useful to rapidly identify NoV as the likely aetiology. Because of the limited availability of timely and routine laboratory diagnostic methods, a clinical diagnosis of NoV infection is often used. The Outbreak Kaplan Criteria are very specific—when all four criteria are present, there is a high likelihood that the outbreak is attributable to NoV.

There is no specific drug to treat people with NoV infection. Symptomatic therapy consists of replacing fluid losses and correcting electrolyte disturbances. No vaccine is available.

In Belgium, the Superior Health Council recommends to apply general precautions in our daily practice. Appropriate hand hygiene is likely the most important method to prevent NoV infection and control transmission. Ethanol-based hand sanitizers (≥62% ethanol) may be

helpful as an adjunct method of hand hygiene, but should not replace washing with soap and water.

In case of hospital outbreak, the Belgian Superior Health Council advises to implement additional contact (and droplets if needed) precautions. Several key approaches to interrupt NoV spread followed by most of European countries are fully described by the Centers for Disease Control and Prevention (USA). They consist mainly in managing patients with suspected NoV infection with careful attention to hand hygiene practice, cleaning and disinfecting the contaminated environmental surfaces. Strict control measures, including isolation or cohorting of symptomatic patients, exclusion of affected staff, and restricting new admissions in affected units are disruptive and costly but might be required to curtail outbreaks.

Therefore, in front of a gastroenteritis outbreak, think norovirus, as it has a considerable public health impact. It is important to diagnose rapidly a beginning NoV outbreak in order to apply as soon as possible prevention measures to limit NoV spread.

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