Lessons learnt from a norovirus outbreak caused by bottled mineral water

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Background and objectives:

A norovirus gastroenteritis outbreak affecting 4,136 individuals was reported in Catalonia (Spain) in April 2016. The Catalonian Public Health Agency pointed towards drinking spring water bottled in Andorra as the source of infection. The company producing the bottled water recalled as a precautionary measure more than 6,150 water coolers. The water complied with all requirements of the European Commission directive on the exploitation and marketing of natural mineral waters. Our objective was to estimate the risk of infection in conditions of natural exposure.

Methodology:

A questionnaire on water consumption and occurrence of symptoms was performed on 26 exposed individuals. Saliva samples were collected to determine norovirus susceptibility (secretor status). Water analysis was performed RTqPCR following ISO/TS 15216-1:2013, and treatment with a viability dye prior to RTqPCR was included to provide a better estimation of the infectious viral titer.

Results and conclusions:

GII infections were only detected in secretor individuals, while GI infections were detected in both secretors (73%) and non-secretors (27%).

High levels of total genome copies (gc) per liter of both norovirus genogroup I ($1.1x10^3$) and II ($5.8x10^3$) were detected in the water samples. Infectivity of GI viruses was higher than for GII. ID_{50} causing illness may be figured for an ingested dose of ~400 gc/day for GI, and of ~3000 gc/day for GII. The use of PMA indicated that only 0.3-5.6% of genomes detected by regular RTqPCR contained undamaged capsids, rendering much lower illness doses.

Management of microbial risks of commercially produced mineral waters could benefit from additional analysis for relevant viral pathogens such as norovirus.

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