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## REVIEW ARTICLE

### Review on- Noro Virus

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#### ABSTRACT

The focus of this paper is Noro virus, also called as winter vomiting bug. Main causative for gastroenteritis. This is a positive single stranded RNA virus belongs to caliciviridae family. This virus attack cause vomiting and diarrhoea but usually clear up in a few days. Noro virus is the most detected pathogen in sporadic diseases. Generally spreads through faeces and vomiting. The illnesses spread easily and cause stomach flu. Control measures include closure of units and thorough disinfection using sodium hypochlorite. Personal hygiene and isolation of affected patients. Vaccines and medication are still now unclear. The significant disruption of patients care and cost of this single nosocomial outbreak support aggressive efforts to prevent transmission of the virus.

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### 1. Introduction

Norovirus infection can cause the sudden onset of vomiting and diarrhoea. It is highly contagious and commonly spreads through food or water that is contaminated [1,2]. Chance of infection increases through close contact with infected persons [3,4]. Generally the infection begins after 12-48hrs after exposure. Symptoms last to 3 days. Most cases recovery is possible without treatment. Peoples, specially adults and infants require medical care and attention [5,6].

**Virology:** This virus belongs to family caliciviridae. This a group of non-enveloped isohedral virus that has single

strand, positive sense RNA genome [7,8]. They are 27-nm like particles. They are physically small rounded structure. The human norovirus genome is consist of a linear positive-sense RNA that is ~7.6kb in length [9,10]. The genome is covalently linked to the viral protein genome at the 5' end and polyadenylated at the 3' end. There are three open reading frames (ORFs) designated as ORF-1, ORF-2, ORF-3, encoding eight viral proteins. ORF-2 and ORF-3 encode the structural components of virions, viral proteins 1 (VP1) and VP2. The mature virion contains 90 VP1 dimers

assembled with isohedral symmetry and arranged in such a fashion as to create hollow or cup-like structure on the virus surface<sup>[11]</sup>. ORF1 encodes a polyprotein that is proteolytically processed into 6 nonstructural proteins, including the norovirus protease and RNA-dependent RNA polymerase<sup>[12]</sup>.

#### Causes

- Highly contagious virus are shed in the faeces and vomit of infected person
- Eating/drinking contaminated food or water.
- Touching your hand to mouth after contact with contaminated substances.
- He breathe of the infected person with has virus particles.
- Unhygienic habits like unwashed hands, uncleaned washrooms<sup>[13]</sup>.

#### Spreading

Virus transmission depends on the host as well as the interaction with the environment. Virus are the probably most common causes of infectious disease acquired indoor. Rapid spread of virus mostly occur in places like schools, hospitals, nursing homes and hotels<sup>[14]</sup>.

#### Symptoms

- Nausea or projectile vomiting
- Abdominal pain and cramps
- Watery or loose diarrhoea
- Malaise
- Low grade fever
- Muscle pain, body aches
- Sudden sickness
- Dehydration due to vomiting and diarrhoea.

#### Histological change

Norovirus secretes intract with intestinal mucosa with specific histological changes including broadening and blunting of the villi, shortening the microvilli. Enlarged and pale mitochondria, increased cytoplasmic vacuolation and intracellular edema. Abnormalities are apparent in intestinal epithelial cells of norovirus-infected volunteer electron microscopy analysis reveals that these cells remain intact, crypt cell hyperplasia has also been reported<sup>[15]</sup>.

Enteroocyte changes like, mild inflammatory infiltration into the lamina propria intestinal lesions are seen, which resolves within two weeks. Apoptosis of enteroocytes are also seen in humans, pigs and mice. Lymphocytes during Norovirus infection could cause enteroocyte apoptosis upon perforin release this can cause both direct and indirect mechanism to norovirus induced apoptosis of enteroocyte. This can infect the host for weeks or month. The norovirus present in a fully functional immune system, similar to Feline caliciviruses that becomes the reservoir of virus perpetuating its spread within the population<sup>[16]</sup>.

#### Diagnosis

Based on the symptoms. However during outbreaks the ELISA and RT-PCR methods are used. But the sensitivity of ELISA kits and the scope of the Ridascreen test were considered disappointing. ELISA screening is used in preliminary testing. The identification of virus is done by faecal sample testing<sup>[17]</sup>.

**Epidemiology:** Noro virus causes an average of 570–800 deaths, 56,000–71,000 hospitalizations, 400,000 emergency department visits, 1.7–1.9 million outpatient visits, and 19–21 million total illnesses per year. Persons > 65 years of age are at greatest risk for norovirus-associated death, and children < 5 years of age have the highest rates of norovirus-associated medical care visits. Endemic norovirus disease occurs year round but exhibits a pronounced winter peak and increases by 50% during years in which pandemic strains emerge. These findings support continued development and targeting of appropriate interventions, including vaccines, for norovirus disease. Also approximately can cause 50,000-100,000 child death every year<sup>[18]</sup>.

## 2. Prevention

- Clean environment
- Isolation of infected people
- Frequent and clean hand washing
- Avoid contaminated food and water
- Well cleaned fruits and vegetable
- Avoid oysters
- Vomit or faeces should be cleaned and disinfected
- Surrounding should be neat and clean
- Disinfect virus containing area
- Stay home from work
- Avoid traveling
- Wash and clean the items like bedding clothes which may contain viruses
- A wide range of product like disinfectant and antimicrobial solutions are registered at EPA, which gives better results [19].

## 3. Treatment

No specific treatment is there recovery generally depends upon the health of the immune system of the affected people.

- Drink plenty of water to replace the water lost in dehydration, caused by vomiting and diarrhoea.
- Paracetamol can be taken in case of any fever, aches and pain
- Take rest
- Eat plain food
- Special rehydration drinks can also be administered.
- Antidiarrhoea and antiemetic medications can also be taken [20,21].

#### Vaccines

Still now there is no vaccines for norovirus. There is no antiviral medications that works against norovirus. Also no antibiotics can also be used against them because since antibiotics work against bacteria. Results of VLP vaccine trials appear promising. However, the rapid evolution of norovirus genotypes through antigenic drift and changing glycan specificities provide new challenges to epidemiology studies and vaccine trials<sup>[22]</sup>.

#### Outbreaks at US

About 18.2% of all infections and 65% of ward closures during a period of 2 years time, a new study published in the

February issue of the American Journal of Infection Control (APIC). 882 hospitals were included in this study of that 35% of the hospitals have least of one outbreak in the two year period time. Four microorganisms were responsible of that 60% of the outbreak is due to Norovirus [23,24,25].

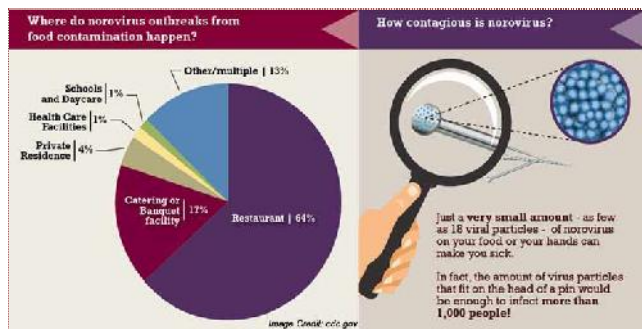


Fig 1: Over view of Norovirus

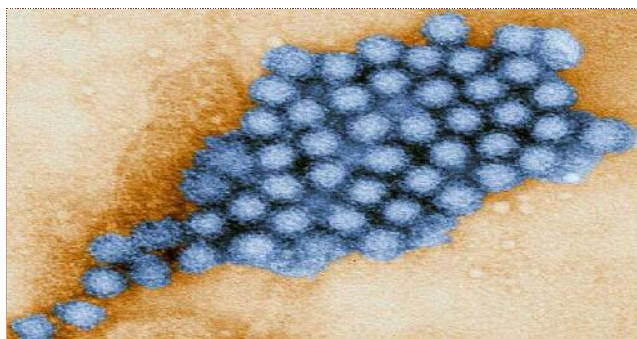


Fig 2: Virology of Norovirus

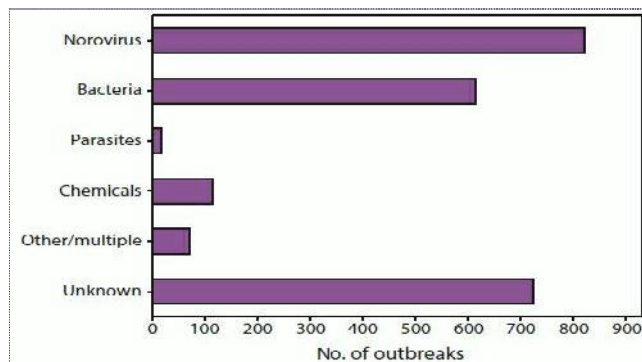


Fig 3: Outbreaks at US

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