

Investigation of Norovirus Outbreak in Elderly Care Center A in Taipei City

Yan-Lin Chen, Peing Chuang

1. Song Shan District Health Center, Taipei City

2. Taipei City Hospital

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Abstract

On the afternoon of November 11, 2006, an outbreak with symptoms of diarrhea, vomiting, and fever occurred among the residents in elderly care center A in Taipei City. Bacterium anal swabs and fecal samples were collected from the 8 cases and 3 cooks who showed no symptoms and sent for further testing at Research and Diagnostics Center of the Centers for Disease Control. Among the 11 fecal samples, norovirus was found in 4 of which belonged to 2 residents and 2 care workers; thus showing a 36.3% positive rate in the testing. After preventive measures such as the isolation of the patients, disinfection of the environment and facilities, and the restriction of the personnel which were administered on the 15th of November, no new cases occurred after the 19th of November. Further quarantine of patients stopped after the end of the outbreak on November 29.

Keyword: norovirus, vomit, diarrhoea

Introduction

In the recent years, norovirus induced outbreaks within hospitals and

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Correspondence: Chuang Peing; Address: 7F, NO. 100, Kuenming St. Taipei City, 10844, Taiwan, R.O.C.

e-mail: ymhpc@health.gov.tw

medical facilities have become a serious issue [1]. In 2006, norovirus induced outbreaks are starting to increase. According to data collected from the syndromic reporting system of the Centers for Disease Control for diarrhea, 61 of the 72 outbreaks were confirmed to be induced by the norovirus [2]. Norovirus induced outbreaks are commonly seen in care centers, hospitals, psychiatric wards, handicapped centers, and other long-term care facilities where there is a high density of persons [3]. The norovirus infection is an intestinal virus infection which is common in the autumn and winter seasons. Its main symptoms include nausea, vomiting, diarrhea, abdominal pain, cramps, and fever. The virus can remain in fecal or vomitus for long periods of time and with the contamination of the environment and facilities. Large scale infections can easily occur in densely populated organization [4].

On the afternoon of November 15, 2006, the Centers for Disease Control received a report from Department of Health of the Taipei City Government indicating that an unknown cause outbreak of diarrhea, vomiting, and fever has occurred in the elderly care center A. Therefore, investigators were sent to conduct relevant epidemiological investigations for the purpose of understanding the scale of the outbreak, transmission route, disease pathogen, and evaluating proper preventive measures in containing the outbreak.

Investigation Sites

The elderly care center A mainly receives the elderly with Alzheimer's disease. Its building is 3 stories high with the outbreak occurring on the second floor. A total of 64 beds are on the second floor and is currently accommodating 60 residents. There are a total of 8 single bed rooms, 8 double bed rooms, and 4 four bed rooms which accommodate 1-4 persons. The floor is separated by the

nurses' station into a blue sector and pink sector. The blue sector accommodates male residents whereas the pink sector accommodates female residents. Each sector includes a cafeteria, activity area, corridors, and bathrooms.

Within the facility, there is a water fountain which has already been examined and filter changed on September 9, 2006. Each resident has a water cup with no name indicated that is disinfected twice each day. The residents' meals are prepared by the kitchen in the facility and distributed. The distribution room is clean and bright with good air ventilation. Each person has one food tray and one set of utensils. However, these are used by all and are disinfected each time after use. After the outbreak occurrence, all cases that showed symptoms are required to use disposable meal boxes until the end of the outbreak.

Each bed room is equipped with a bathroom, yet most residents use the public restrooms on the two sides of the nurses' station. After observing the residents' usage of the restroom, the residents seem to not have washed their hands afterwards. Those who are unable to take care of themselves have staff members who assist in doing so.

There are a total of 25 staff members with one supervisor, 10 nurses (one for every 3 shifts), 15 care workers (5 during the day, 2.5 in the afternoon, and 2 at night). In addition, there are 2 janitors and 3 cooks. Apart from the 1 nurse and 2 care workers who showed diarrhea symptoms, the other personnel showed no similar symptoms.

Outbreak Scale

In this outbreak, the case is defined by whoever showed any of the following symptoms: nausea, vomiting, diarrhea, abdominal ache, or fever after the 10th of November. By November 15, a total of 8 cases, 5 residents, 1 medical personnel,

and 2 care workers, fit the case description, all of which were from the pink area. The highest occurrence rate of the symptoms is abdominal pain (100.0%), followed by vomiting (12.3%). The overall attack rate is 13.3% (8/60). Among the 5 resident cases, 4 of the cases resided in room 202 and 1 in room 208. These patients along with the 1 medical personnel and 2 care workers are all female cases with the age span between 60 to 90 years of age.

Transmission Route

According to the onset dates of 8 cases, the transmission route is shown in the epidemic curve as seen in Figure 1. The curve show a sudden rise toward the right on the 12th and 13th of November with a single peak indicting a likely common source transmission. However, separate cases were detected in the residents during this period; thus showing a possible mode in which the transmission occurred between persons.

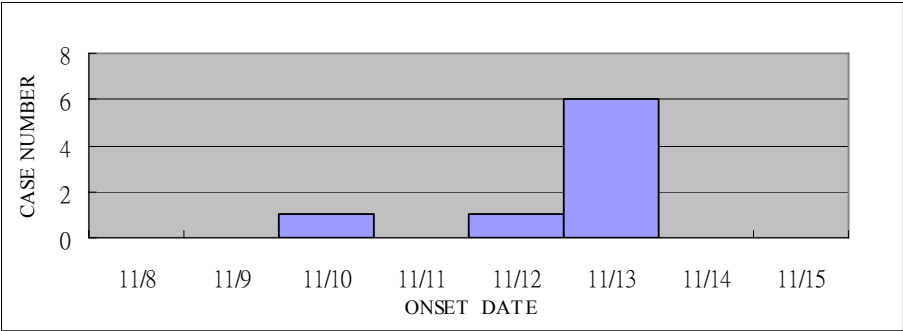


Figure 1. Distribution of Onset Dates of Norovirus Infection in Elderly Care Center A in Taipei City

Discussion of Cause of Disease

The most commonly seen route of transmission in diarrhea outbreaks is

through person-to-person contact or a common source mode [1]. At beginning, the possible common source, such as drinking water, food, needs to be pinpointed. One water dispenser is located on each floor level and is the only drinking water source for both residents and staff members. However, only 8 cases occurred and not all of the residents and staff members; thus the possibility of a contaminated water source is eliminated. The food includes three meals a day plus desserts. These are provided by the kitchen within the facility. The food is provided to residents and staff members on all three floor of the facility. Apart from the 8 cases, no other cases were found in other floor levels. In addition, all 3 cooks showed negative results in the tests for norovirus. Therefore, the possibility of the food being contaminated with the norovirus virus is eliminated. Although the eating utensils are shared, they are all disinfected after usage; thus not a possibility either.

The first case was treated for diarrhea on November 10 after showing symptoms. On November 12, another resident (a roommate) also started to show symptoms. By the 13th of November, a total of 5 cases were reported (including 3 residents, 1 nurse, and 1 care worker). Afterwards, a case of another care worker was report; thus showing a person-to-person transmission route between persons. The spread of the epidemic may be due to the fact that the first case of diarrhea was not diagnosed as induced by the norovirus; therefore, no preventive measures were taken.

The test results of the first case showed negative for the norovirus. This is speculated to be due to the fact that there may be other intestinal diseases prominent or that the fecal samples were sent for testing 11 days after the discovery of the symptoms. The care workers that were infected all were in charge of the residents occupying room 202. The incubation period of the

norovirus is usually 12 to 48 hours with the symptoms occurring for 12 to 60 hours. Afterwards, the patient usually recovers quickly [5]. Therefore, it is difficult to determine the relative cause of the disease and therefore difficult to pinpoint the exact transmission origin, only that there is a connection between the contamination of the residents of room 202 and the care workers in charge of the room. The residents that were infected living in room 208 shared tables with those from room 202. In addition the care workers in charge of room 202 also took care of those in room 208; therefore resulting in the fact that the outbreak was not contained in room 202 only. According to the previous reasons, it is speculated that contact transmission is the cause of this outbreak.

Sample Collection and Laboratory Tests

During the period between November 15 and 20, the bacterium anal swabs and fecal samples were collected from the 8 cases and 3 cooks who showed no symptoms and sent for further testing at Research and Diagnostic Center of the Centers for Disease Control . The samples were tested for cholera, typhoid, Enteritis vibrio, Salmonella, norovirus, and rotavirus. According to the test results on the 22 and 23 of November, all the bacterium anal swabs showed negative results. 4 of the 11 fecal samples showed Norovirus. These samples were collected from 2 residents and 2 care workers; thus showing a 36.3% positive rate in the testing. Therefore, it is determined that the pathogen of this outbreak is Norovirus.

Preventive Measures

1. Individual cases:

- (1) Stopping the use of carminative. Those with more severe symptoms are recommended to be medically treated. Care workers diagnosed with the

disease are required to stay home.

- (2) Staff members aiding with patients are required to disinfect their hands with alcohol 3 times a day.

2. Environment:

- (1) Due to the fact that the index case did not show improvement after treatment, she was sent to the hospital and was further diagnosed as gastroenteritis and was detained for 3 days for further observation on November 15. In order to prevent the further spread of the epidemic, the patients were quarantined in rooms 202 and 208. Tables and chairs were also used in the corridor to separate the quarantined area and the clean area. Rooms 202 and 208 were set as the quarantine area, and the patients were restricted to this area. The corridors on the two sides were separated by tables and chairs, preventing any cases which did not show symptoms upon entering these two rooms. The cases were only allowed to leave the quarantined area 6 days after the symptoms ceased.

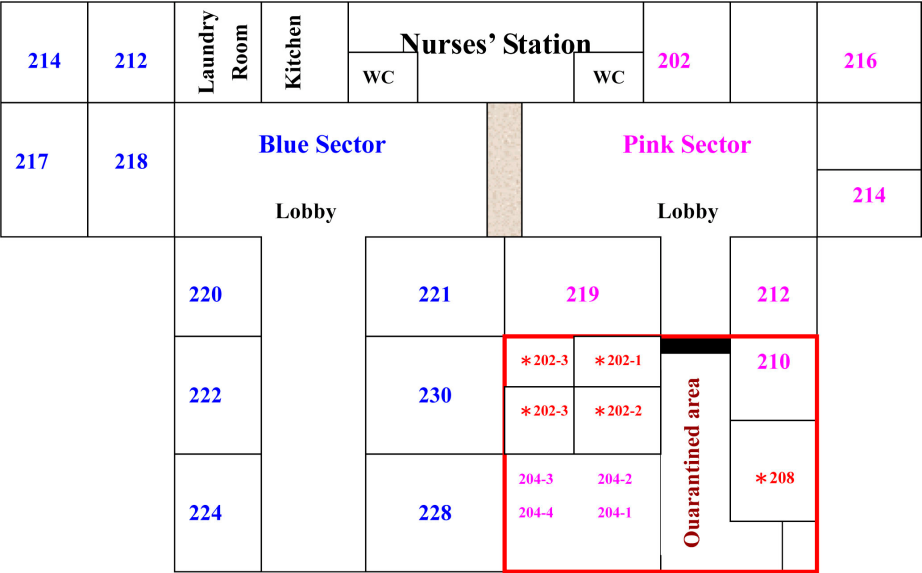


Figure 2. Distribution of Norovirus Infection Cases in Elderly Care Center A in Taipei City

* cases

- (2) During the epidemic, all group activities and visiting services were stopped.
- (3) In enhancing the environment sanitation, the environment must be cleaned with diluted chlorine (500 ppm) twice a day. The locations needed to be disinfected include floors, tables, chairs, bed posts, bed cabinets, public areas, restrooms, case room, bedrails, doorknob, closets, and handrails until the end of the epidemic.

3. Residents:

- (1) Emphasize the importance of washing hands, disinfecting, and personal hygiene in order to prevent the epidemic from further spreading in the facility.
- (2) 75% alcohol is prepared at the entrance for medical personnel and cases to

use upon leaving and entering in lowering the risk of cross infections.

- (3) A diluted bucket of chlorine is recommended to be put at the sink for cases to immerse their hands in after restroom usage before returning to their rooms.

After the preventive measures were taken, no more new cases were found after November 19. Further quarantine of patients stopped after the end of the epidemic on November 29.

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