## OUTBREAK OF GASTROENTERITIS ASSOCIATED WITH DRINKING WELL WATER - BRITISH COLUMBIA

On the morning of 3 April 1990, notification was received that 19 members of a church group of 27 had become ill after eating lunch at a residential retreat facility 2 days earlier. Signs and symptoms of the illness included nausea, vomiting, diarrhea and abdominal pain. The illness began after an incubation period of 33-40 hours.

Four foodhandlers, one who had worked while ill, displayed the same signs and symptoms as the church group members who were ill. The deputy chef had been hospitalized 3 weeks previously and treated for an undetermined stomach ailment, which included abdominal pain and diarrhea. On 4 April, a local physician reported that 17 patients had presented to his office with vomiting, diarrhea and abdominal pains. Ten of these 17 patients had eaten lunch at the facility on 1 April, while the remaining 7 appeared to have no connection with the facility. A group of 35 persons stayed at the facility from 28 March to 1 April. One of this group had recently been in Mexico and had returned to Canada with diarrhea, which continued until 1 April. Two housekeeping staff and a maintenance man at the facility were also sick. The maintenance man did not eat at the facility but did drink the water. Seven stool specimens, collected from symptomatic individuals, were found negative for both pathogenic bacteria and viruses when examined at the laboratory.

This facility obtains its water from an untreated privately owned supply, which includes a well 177 metres (586 feet) deep and a 454,609 litre (100,000-gallon) reservoir. The pump had been replaced 3 weeks prior to the start of the outbreak, and had been lowered 33 metres (100 feet) to the 158-metre (480-foot) level 2 days prior to the start of the outbreak. A water sample taken from the reservoir was negative for total and fecal coliform bacteria, but showed a total plate count of 234 colony-forming units/mL. Twenty-three litres (5 gallons) of household bleach were added to the reservoir on 5 April. Chlorine residual tests done the following day showed 0.2, 1.0, 1.0, 1.0 ppm free chlorine and 4 water taps throughout the system. A chlorinator was ordered for attachment to the water supply. The sewage system was inspected and revealed no potential for cross-contamination.

The kitchen was closed on the evening of 4 April, and staff and patrons staying at the facility were advised not to drink the water, but to use the bottled water provided. All desserts, which had been prepared by the pastry chef while he was ill with diarrhea were sampled and the remainder destroyed. Most of these items contained either raw egg white or lightly cooked egg yolks and cream. A sample of kitchen ice had a total coliform count of 222. Sixteen potential for cross-contamination.

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samples of tap water, the water tank and the ice grew multiple bacterial organisms. Most of these were environmental bacteria but some i.e., *Streptococcus faecium, Aeromonas hydrophila* and *Enterobacter agglomerans* are potential human pathogens. The ice machine which was used constantly, had not been cleaned and maintained regularly.

Although the senior kitchen staff had received some education in food handling techniques some basic principles of good sanitation were lacking in the food preparation area, such as the use of bleach, sanitization of cutting/work surfaces or adequate cleaning of the floor.

By the end of 6 April, data were available on 100 individuals who had been ill out of 264 known to have eaten at the facility. A food-specific attack rate analysis implicated potato salad (p = 0.02, Fisher’s exact test) and drinking water (p = 0.04, Student’s t-test). Average duration of illness was 12-14 hours.

The facility was permitted to continue its food service during the course of this outbreak by using a private catering company and by ensuring that drinking water and ice were obtained from other approved sources. On 10 April, the kitchen was re-opened and the water supply, with the addition of a chlorinator, was put into use again.

Since control measures had been introduced, there were no further cases of illness associated with the facility. An educational program was started for the operators and employees of the facility, which will be combined with enhanced inspections in the future.

**Discussion**

With the food-specific attack rate for illness having implicated water, the positive plate count from the reservoir, the elevated total coliform count and positive cultures from the ice, the pump having been lowered 33 metres (100 feet) in the well 2 days prior to the outbreak, and the water supply not chlorinated, the most likely cause for this outbreak is a waterborne bacteria or virus. The hypothesis was that the sludge at the bottom of the well contained pathogenic bacteria but, without a sample from this source, this could not be confirmed. The incubation period (33-40 hours) and duration of illness (12-14 hours) is consistent with bacterial (*Escherichia coli, Vibrio parahaemolyticus*) or virus (Norwalk) illness. The Norwalk virus can be spread by the fecal-oral route, the aerosol route, by food or by water. Four of the foodhandlers had been ill and probably worked while incubating the illness. At least one foodhandler continued to work when experiencing diarrhea.

No specific problem was found with the preparation of the potato salad. However, some basic food sanitation principles were not being used, and potentially hazardous desserts containing cream and either raw egg whites or lightly cooked egg yolks were displayed at room temperature.

Without the identification of the specific pathogen from an identified source, it is not possible to confirm the cause of this outbreak; however, the evidence strongly suggests that this was a waterborne outbreak.

**Source:** T. Johnstone, MD, M Marchenski, RPH, W Hines, RPHI, J Davis, RPHI, S Eng, RPHI, G Gibson, RPHI, SHS Peck, MB, MSc, Capital Regional District Health Protection and Environment Office, Victoria, British Columbia.

223. Les cultures réalisées sur 16 échantillons d’eau provenant du robinet, du réservoir et des glaçons montrèrent diverses bactéries. Dans la plupart des cas, il s’agit de bactéries qui sont normalement présentes dans l’environnement, mais certaines, dont *Streptococcus faecium, Aeromonas hydrophila* et *Enterobacter agglomerans* peuvent être pathogènes pour l’homme. La machine à glaçons, qui fonctionnait continuellement, n’était pas nettoyée et entretenu régulièrement.

Bien que le personnel de cuisine ait reçu une formation en ce qui concerne les techniques de manipulation des aliments, certaines principes de base d’hygiène n’étaient pas appliqués dans les aires de préparation des aliments, comme l’utilisation d’eau de javel, la désinfection des surfaces de coupe et de travail ou le nettoyage rigoureux des planchers.

À la fin de la journée du 6 avril, on a recueilli des données sur 100 sujets malades parmi les 264 qui ont mangé au centre. L’analyse du taux de survenue par type d’aliment met en cause la salade aux pommes de terre (p = 0.02, méthode exacte de Fisher) et l’eau potable (p = 0.04, Test T de Student). La durée moyenne de la maladie est de 12 à 14 heures.

Le centre a pu continuer à servir des repas pendant la période de l’épidémie en faisant appel à un service de traiteur et en veillant à ce que l’eau potable et les glaçons proviennent d’autres sources homologuées. Le 10 avril, on a réouvert la cuisine qui a recommencé à s’alimenter en eau à la source habituelle à laquelle on avait ajouté un chlore.

Depuis que ces mesures appropriées ont été instaurées, il n’y a pas eu d’autres cas reliés à ce centre. En outre, on mis sur pied un programme éducatif à l’intention des exploitants et des employés de l’établissement, qui sera complété par des inspections plus rigoureuses dans l’avenir.

**Discussion**

Étant donné les éléments d’information dont on disposait, à savoir : la mise en cause de l’eau par l’examen du taux de survenue, des bactéries dans un échantillon d’eau du réservoir, la numération totale élevée de coliformes, les cultures positives réalisées sur les glaçons, l’abaissement de la pompe dans le puits 2 jours avant l’épidémie des premiers cas et l’absence de chloration de l’eau provenant du puits, on a conclu que la cause la plus probable de cette épidémie est un virus ou une bactérie contaminant l’eau de boisson. On suppose que les boues qui se trouvaient au fond du puits contenaient des bactéries pathogènes mais, sans échantillon de ces boues, il est impossible de confirmer cette hypothèse. La période d’incubation (33 à 40 heures) et la durée de la maladie (de 12 à 14 heures) laissent penser qu’il pourrait s’agir d’une maladie imputable à une bactérie (*Escherichia coli, Vibrio parahaemolyticus*) ou à un virus (Norwalk). Le virus de Norwalk peut être transmis par la voie fèco-buccale, par les aerosols, par la nourriture ou par l’eau. Quatre des préposés aux cuisines avaient été malades et ont probablement travaillé pendant qu’ils causaient la maladie. Au moins l’un d’entre eux a travaillé pendant qu’il avait la diarrhée.

On n’a pas trouvé de problème particulier en ce qui concerne la préparation de la salade de pommes de terre. Il reste néanmoins que certains principes de base d’hygiène alimentaire n’étaient pas suivis ; certains desserts potentiellement dangereux, qui contenaient de la crème et des blancs d’œufs cuits ou des jaunes d’œufs partiellement cuits, étaient laissés à la température ambiante.

Étant donné qu’on n’a pu déterminer ni l’agent pathogène ni la source de contamination, déterminée, il est impossible de connaître la cause de l’épidémie. Il reste plausible que la maladie a été causée par une contamination de l’eau potable.

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FOOD AND WATERBORNE VIRAL OUTBREAKS IN CANADA AND THE UNITED STATES

A CDC, Atlanta, report discussed disease outbreaks attributed to foods (other than drinking water) in the United States during the 5-year period 1983-1987. Of 2,397 reported outbreaks (91,678 cases), 62% (1,488 outbreaks, 57,138 cases) were of unknown etiology, whereas 1.7% (41 outbreaks, 2,789 cases) were confirmed as viral: hepatitis A virus (HAV), 29 outbreaks (1,067 cases); Norwalk agents, 10 (1,164); and other viruses, 2 (558). In Canada, for the same period, published reports have revealed 15 viral foodborne outbreaks (554 cases): HAV, 3 (15 cases); Norwalk agents, 11 (4 were related) (177 cases); and other viruses, 4 (362 cases). There were at least 18 additional outbreaks (823 cases) of probable (but unconfirmed) viral etiology and a cluster of 3 HAV cases which were possibly foodborne. Since this time period, in Ontario (1988), 70 persons (in 4 related outbreaks) suffered Norwalk-like gastroenteritis after consuming sandwiches; a virus was suspected since no bacterial agent was isolated. In California (1988), Snow Mountain virus was the etiologic agent in 183 gastroenteritis cases which started with a shrimp meal, but person-to-person spread followed. Six HAV foodborne outbreaks occurred in the U.S. (1988-1989) and involved 498 persons.

With regards to drinking water-related disease outbreaks, in the 3 years, 1986-1988, the CDC reported 50 such outbreaks involving 25,486 persons in the U.S. and Puerto Rico. In 48% of these, the etiology of acute gastrointestinal illness could not be determined but Norwalk-type agents were confirmed as causing 6% (3 outbreaks, 4,674 cases). In addition, 26 outbreaks of illness were associated with recreational water, with 1 due to a Norwalk-like agent which affected 41 swimmers. In Canada, 2 outbreaks of Norwalk-like illness, which affected 1,326 persons in Alberta and 100 in British Columbia, were attributed to contaminated drinking water, but the etiologic agent was not identified.

References

ÉPIDÉMIES DE CAS D'INFECTION VIRALE D'ORIGINE ALIMENTAIRE ET HYDRIQUE AU CANADA ET AUX ÉTATS-UNIS

Dans un rapport publié par les CDC d'Atlanta, on a analysé les épidémies attribuées à des aliments (autres que l'eau potable) aux États-Unis entre 1983 et 1987. Parmi les 2,397 épidémies (91,678 cas), 62% (1,488 épidémies, 57,138 cases) étaient d'origine inconnue, alors que 1,7% (41 épidémies, 2,789 cases) étaient des infections virales confirmées: virus de l'hépatite A (VHA), 29 épidémies (1,067 cas); agents de type Norwalk, 10 épidémies (1,164 cas); et autres virus, 2 épidémies (558 cas). En Canada, durant cette même période de 5 ans, les rapports publiés ont fait état de 15 épidémies d'infections virales d'origine alimentaire (554 cas): HVA, 3 (15 cas); agents de type Norwalk, 11 (4 cas liés) (177 cases) et d'autres virus, 4 (362 cases). A cela s'ajoutent au moins 18 autres épidémies (823 cas) d'infections virales probables (mais non confirmées) et une grappe de 3 cas d'infection à VHA n'était peut-être pas d'origine alimentaire. Depuis cette période, in Ontario (1988), 70 personnes (au cours de 4 épidémies) ont souffert d'une gastro-enterite similaire cliniquement à celles dues aux virus de type Norwalk après avoir mangé des sandwichs; on a présumé qu'il s'agissait d'un virus puisqu'aucun agent bactérien n'a été isolé. En Californie (1988), le virus de Snow Mountain a été incriminé dans 183 cas de gastro-entérite: le virus qui se trouvait initialement dans un plat de croquettes s'est propagé ultérieurement par transmission interhumaine. Six épidémies de cas d'infection à VHA d'origine alimentaire sont survenues aux États-Unis en 1988-1989 et ont touché 498 personnes.

Pour ce qui est des cas de maladies transmises par l'eau potable, entre 1986 et 1988, le CDC a signalé 50 épidémies touchant 25,484 personnes aux États-Unis et à Porto Rico. Dans 48% des cas, on n'a pas pu établir la cause de l'affection gastro-intestinale aiguë, mais 6% des cas étaient des infections confirmées attribuables aux agents de type Norwalk (3 épidémies, 5,476 cases). En outre, 26 épidémies de cas de maladie ont été associées à la baignade. L'une d'elles est attribuable à un agent de type Norwalk qui a infecté 41 nageurs. En Canada, 2 épidémies de cas liées par un agent de type Norwalk ont atteint 1,326 personnes en Alberta et 100 en Colombie-Britannique; la maladie a été transmise par de l'eau potable contaminée, mais l'on n'a pas réussi à isoler l'agent responsable.

Références
Update

CHOLERA EPIDEMIC IN SOUTH AMERICA - 1991

Brazil: As of 2 May, the Brazilian Ministry of Health has reported a total of 6 confirmed cases of cholera in Amazonas State.

Chile: As of 6 May, health authorities in this country have reported a total of 25 cases and 1 death.

Ecuador: As of 2 May, a total of 8,456 cases (2,052 confirmed) and 192 deaths have been reported in Ecuador. Cotopaxi Province is now reported to be infected.

Peru: As of 2 May, the Ministry of Health in Peru has reported a total of 171,204 cases with 85,052 hospitalizations and 1,243 deaths.


Editorial Comment

The Advisory Committee on Epidemiology is currently reviewing a proposal for surveillance of outbreaks in Canada. At least one province, Ontario, is planning to integrate an outbreak reporting component into their communicable disease surveillance system.

Mise à jour

ÉPIDÉMIE DE CHOLÈRE EN AMÉRIQUE DU SUD - 1991

Brésil: Dès le 2 mai, le ministère de la Santé du Brésil a confirmé un total de 6 cas de choléra dans l’état de l’Amazonas.

Chili: Dès le 6 mai, les autorités sanitaires dans ce pays ont signalé un total de 35 cas et 1 décès.

Équateur: Dès le 2 mai, un total de 8456 cas (2052 confirmés) et 192 décès ont été signalés à l’Équateur. La province de Cotopaxi est maintenant signalée d’être infectée.

Pérou: Dès le 2 mai, les autorités sanitaires péruviennes ont signalé un total de 171204 cas probables, 85052 hospitalisations et 1243 décès.


The Canada Diseases Weekly Report presents current information on infectious and other diseases for surveillance purposes and is available free of charge upon request. Many of the articles contain preliminary information and further confirmation may be obtained from the source quoted. The Department of Health and Wellness does not assume responsibility for accuracy or authenticity. Contributions are welcomed (in the official language of your choice) from anyone working in the health field and will not preclude publication elsewhere.

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