GASTROENTERITIS RELATED TO FOOD AND/OR BEACH BATHING

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NOTIFICATION

On November 14, 1991 a general practitioner notified the Eastern Sydney Area Public Health Unit of seven cases of gastroenteritis among eight-year-old children who had attended a private birthday party. Some of the children had also attended a school picnic the next day. The mother hosting the party was keen to find the cause of illness and had kept any portions remaining from the foods served at the party. A list of guests and their telephone numbers were provided.

PRELIMINARY INVESTIGATION

The remaining food samples, including avocado dip, hommos dip, taramosalata dip, frankfurts and dried apricots, were collected and delivered to the Food Microbiology section of the Division of Analytical Laboratories. Bacteriological examination of foods consisted of standard plate count and quantitation of faecal coliforms, E coli and salmonellas.

A telephone questionnaire was given to parents of the children at the party. The questionnaire sought demographic information and asked about foods which had been eaten at the party, and presence and onset of any symptoms of enteric illness. It became apparent that some of the children had also attended a school picnic at Parsley Bay (a Sydney Harbour recreational area) the day after the birthday party. The picnic had been organised for Year 3 pupils of a local primary school, and their families. Activities at the picnic included swimming in Parsley Bay.

Cases were defined as persons who had experienced at least one of the symptoms of nausea, vomiting or diarrhoea, with onset during the period November 10-18, 1991 (the day after the party until no further cases were reported).

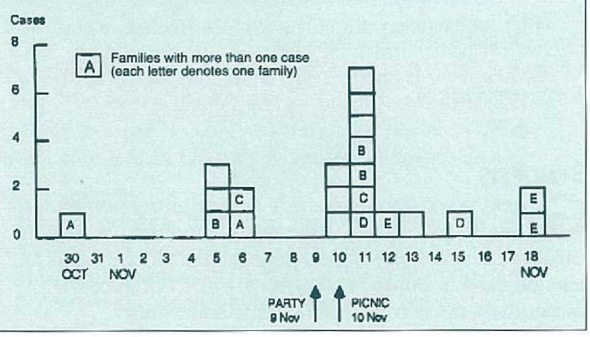
SECOND-STAGE INVESTIGATION

During the initial investigation it became apparent that a similar illness was reported by classmates of the index cases in the fortnight before the party. This raised the possibility that the cases first reported were caused by clustering of an infection already circulating before the party took place. A second questionnaire was administered to those children (and their parents and siblings) in the school class who had not already been interviewed.

The study population comprised the children who attended the private birthday party or who were in the class for whom the picnic had been organised, their parents and siblings. Cases and controls were taken from this population and compared for presence at the party and at the picnic. Separate case-control analyses were performed among individuals who attended the party to determine whether consumption of a specific food was a risk factor for illness,

FIGURE 2

EPIDEMIC CURVE



and among those at the picnic to determine if swimming with immersion of the face or the consumption of a specific food was a risk factor. Odds ratios and tests for differences in proportion were calculated using EpiInfo software.

The Water Board was approached to determine whether any information existed on microbial pollution of harbour waters at the picnic site.

RESULTS

Food analysis

The frankfurts showed evidence of early spoilage, while the avocado and hommos dips showed low-level contamination with faecal organisms, consistent with use and duration of storage after opening.

Case description

Fifteen persons fulfilled the case definition with onset after the party, and a further six had onset of illness in the 11 days before the party. Of the 21 persons reporting a compatible illness, there were nine females and 12 males. Six cases were in adults and 15 in children, eight of whom were in the Year 3 class under study. Nausea was reported most commonly (17 cases), followed by diarrhoea (13), abdominal discomfort (13), vomiting (12), headache (11) and fever (10). The illness lasted between eight and 48 hours. In no case was a stool sample collected, so a microbiological diagnosis was not available.

Incubation period analysis

When the 21 persons with enteric symptoms with onset from October 30 to November 18 were examined, it was possible to identify households in which secondary cases occurred four to seven days after a previous household case (see Figure 2). This illness, which affected 12 persons from six households, was classified as the 'long-incubation' illness, and presumably was propagated by person-to-person spread. Seven cases, with onset of illness after the party, were not associated with secondary family cases and were classified as 'short-incubation' cases. Although the patterns of symptoms were similar, diarrhoea was more frequent in the 'long-incubation' (11 of 14) than in the 'short-incubation' illness (two of seven, two-tailed Fisher exact test P=0.055).

Case-control studies

Questionnaires were available for 70 individuals – 39 children and 31 adults. In the case-control analyses, two

case definitions were tested, both applying to onset dates from November 10-18. The first definition was of all illness occurring irrespective of incubation period, of which there were 15 cases. The second, more restrictive, definition excluded 'long-incubation' illnesses, and left seven cases.

When an association between illness and party attendance was examined the odds ratios suggested that presence at the party was a significant exposure factor for illness. When all 15 cases were considered the odds ratio was calculated as 6.7 (95% C.I. 1.6-29.4), and rose to 14.7 (95% C.I. 1.9-138) when the case definition was restricted to the seven 'short-incubation' cases.

Two adults and 14 children attended the birthday party – eight cases and eight controls. Consumption of frankfurts, taramosalata dip, hommos dip, avocado dip, doughnuts, whipped cream or birthday cake were not significantly associated with illness using either case definition.

Odds ratios for picnic attendance were not significant using either case definition, and no common foods were eaten at the picnic. But among the 30 persons who attended the picnic, eight of 18 who swam reported illness, while none of 12 who did not swim reported illness. Thus, swimming in Parsley Bay was significantly associated with illness (two-tailed Fisher exact test, P=0.01).

Recreational waters analysis

Although it is not carried out routinely, the Water Board agreed to perform bacteriological examination on Parsley Bay water. Tests on samples collected in mid-January showed significant contamination of bathing waters with faecal coliforms and faecal streptococci from stormwater discharges. The high faecal bacterial counts found at this time were most likely explained by sewage pollution of the stormwater system after heavy rains. However, no rainfall was recorded in the three days before the picnic in November. Thus stormwater-related faecal contamination of bathing waters at Parsley Bay was unlikely to have occurred at the time of the picnic.

Discussion

The investigation was initially confined to the families of children who had attended the birthday party on November 9, 1991. However, two complicating factors rapidly became apparent: many of the children had also attended a class picnic the next day; and similar illnesses had occurred in contacts several days before either event. At this point the study population was expanded to include children in the picnic class (whether or not they attended the picnic) and their household contacts. Analysis of data suggests there were two separate illnesses, which could be distinguished by incubation period and by symptomatology. Diarrhoea was more commonly reported in the 'long-incubation' illness than in the other cases. The association between party attendance and illness was strengthened when cases of 'long-incubation' illness were removed from the analysis. This finding supports the hypothesis that the 'long-incubation' illness, spread by person-to-person transmission, was distinct from the other cases which may have had an incubation period as short as 12-48 hours and may have been truly related to an exposure at the birthday party or picnic.

The clinical features of a brief self-limiting illness, with vomiting more marked than diarrhoea, reports of fever and headache, and an onset 12-48 hours after exposure were strongly suggestive of infection with calicivirus, Norwalk virus or a related small round virus[1]. Laboratory confirmation of these infections is difficult to obtain, as diarrhoeal stool specimens are required and symptoms have usually resolved by the time an investigation is initiated. As well, there are no public laboratory facilities in NSW for virological examination of foodstuffs.

Case-control methods were used to examine causal factors for illness. Attendance at the party was found to be a risk factor for illness, suggesting the source may have been either a highly infectious person at the party or a contaminated food. None of the subjects interviewed admitted to gastrointestinal symptoms on the day of the party. However, transmission from individuals before the onset of symptoms has been shown to occur in rotavirus infection[2] and has been suggested for Norwalk virus infection[3]. The number of persons attending was too small to implicate a single foodstuff as the vehicle for foodborne illness. Bacteriological analysis of avocado and hommos dips suggested some degree of contamination with human faecal organisms, but it was not possible to determine if this occurred during processing, as a result of use by the party guests or due to delay in transport to the laboratory. If contamination with faecal bacteria was a marker for contamination with human enteric viruses, then this may provide an explanation for the outbreak.

Swimming at the picnic, not presence at the picnic, was found to be a second significant risk factor for illness. Although a clear association between the presence of human enteric viruses in recreational waters and illness has not yet been proven[4], it may be hypothesised that the bathing waters were contaminated with one of the small round viruses, which are known to remain viable in seawater (G Grohmann, personal communication). Unfortunately, it was not possible to arrange virological analysis of the water, although this facility may in future be provided by the Water Board (G Grohmann, personal communication). In the absence of heavy rainfall it was not possible to explain faecal pollution of the stormwater system by sewage overflows, although illegal cross-connections between sewerage and stormwater piping would have the same effect. However, enteric viruses are able to survive in marine sediments for many months and may be disturbed and recirculated into the bathing waters[5]. These mechanisms cannot be ruled out as a cause of faecal microbial pollution of the beach waters.

Conclusion

A cluster of cases of mild gastroenteritis was reported due to concern about a possible foodborne source of illness. Cases occurred after, and may have been related to attendance at, a private birthday party, swimming at a class picnic or both.

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Gastroenteritis

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These events took place on two consecutive days of one weekend. Clinical features of the illness were suggestive of infection with calicivirus or a related virus. However, no clinical specimens were obtained for pathological confirmation and it was not possible to test food or water samples for the presence of pathogenic viruses.

Although the outbreak described in this report was a relatively minor one, the investigation of a much larger outbreak is likely to be hampered by the same difficulties. A mechanism to give the NSW public health network rapid access to laboratory services for virological examination of water and foodstuffs is needed to aid the investigation of future outbreaks.

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General practice database

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widely publicised and the database has been used for a range of purposes. These include:

- Production of a document listing doctors willing to receive referrals from the Area Health Service.
- When a district hospital Accident and Emergency Department was closed, the database was used to provide residents with a listing of GPs in their area.
- The Area Health Service sends a monthly newsletter to all GPs. An average of four Area Health Service departments or community service groups and two GPs a month request information be included with the newsletter.
- The Public Health Unit produces a bulletin to inform GPs of infectious disease outbreaks, including reports from the local general practice sentinel surveillance network.
- At the start of an outbreak of hepatitis A the PHU used the database to contact all GPs in the Area. They received information within 72 hours.
- The database has been used as a sampling frame for several research studies.
- Community health and health promotion professionals have used the database to contact GPs serving particular ethnic groups or geographical areas.
- A profile of general practice in Central Sydney has been produced to assist in planning the provision of services in the Area.

DISCUSSION

A comprehensive database of GPs has a wide range of uses at a local level, many of which may enhance the health of the community by allowing timely and locally appropriate information to be disseminated to practitioners.

The frequent requests for information to be sent to GPs indicate a desire, on the part of Area Health Service staff and community groups, to liaise with family doctors in order that available services be used most efficiently. This communication is not just one way, as the newsletter is also circulated to more than 400 salaried and visiting medical staff in the Area and to each clinical department at RPAH, thus increasing awareness of the activities of local GPs.

Compilation of a database at a local level is not particularly time-consuming or expensive. The estimated cost of compiling the database for Central Sydney (which has a population of 330,000), excluding the cost of software development but including all data collection costs and salaries, was $4,000.

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