

Outbreak of SRSV gastroenteritis at an international conference traced to food handled by a post-symptomatic caterer

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(Accepted 11 February 1993)

SUMMARY

In an outbreak of small round structured virus (SRSV) gastroenteritis at an international AIDS conference 67 people were ill with diarrhoea or vomiting, one requiring admission to hospital. Epidemiological investigations demonstrated that the vehicle of infection was food prepared by a foodhandler who was recovering from a mild gastrointestinal illness. The food most strongly associated with illness, coronation chicken, was prepared by the food handler on the second day after symptoms ceased.

The investigation confirms the view that foodhandlers may contaminate food with SRSVs after cessation of symptoms and should remain off work until at least 48 h after recovery.

INTRODUCTION

The importance of foodborne gastroenteritis due to SRSV is increasingly recognized as a public health problem [1]. Two main sources of foodborne infection have been described: (i) shellfish harvested from contaminated waters with inadequate or failed depuration [2–4] and (ii) foods contaminated by an infected foodhandler. Recent outbreaks have suggested that foodhandlers may be infectious for a period after cessation of symptoms [5–7] and the Public Health Laboratory Service (PHLS) has recommended that foodhandlers should not return to work for at least 48 h after recovery [8]. This policy has important resource implications for the catering industry and has been challenged by the industry's medical officers [9].

We describe a large outbreak of SRSV gastroenteritis attributed to a food vehicle prepared by a foodhandler 24 h after recovery from a similar illness.

METHODS

The outbreak and investigation

On 23 April 1990 two reports were received of cases of gastroenteritis in people who had attended a conference from 18 to 20 April. Twenty of the delegates living in the Cardiff area were contacted by telephone on 23 April and 11 of these

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reported suffering an acute gastrointestinal illness suggestive of viral gastroenteritis.

A retrospective cohort study of all delegates and staff who had attended the conference was undertaken. A case was defined as any person who developed diarrhoea and/or vomiting either during the conference or within 72 h of its close. On 26 April a postal questionnaire was sent to all delegates and catering staff. After 2 weeks a further questionnaire was sent out to the non-responders. Faeces from the catering staff and all the cases identified during the preliminary enquiries were cultured for bacterial pathogens by routine methods. Since only faecal samples obtained within 48 h of onset are likely to yield sufficient virus particles to be seen under electron/microscopy [10] only those specimens were sent for virology.

The chi-squared test using Yates continuity correction and the Fisher's exact test were used to compare food specific attack rates. The Mantel-Haenszel summary chi-squared test was used to examine for possible confounding.

RESULTS

Environmental

A member of the catering staff (Foodhandler A) attended a children's party on 15 April and was in contact with a child with a gastrointestinal illness. She became ill with vomiting and diarrhoea on the morning of 17 April, came to work but was sent home after a few hours. By 19 April she was asymptomatic and back at work. She prepared or handled a large number of the foods that were served at the conference.

Epidemiological

Within 2 weeks 192 of 283 delegates (68%) replied to the questionnaire. A further questionnaire was sent to the non-responders and an additional 34 replies were subsequently received. The overall response rate of delegates was 80%. All of the 38 kitchen staff completed a questionnaire.

Sixty-seven (25%) of 263 delegates and staff reported met the case definition for gastroenteritis. The peak onset of illness was 12 April (Fig. 1). There were 30 male and 37 female cases. Five of the cases were catering staff. The age range was from 17 to 59 years (mean 39 years).

The main clinical symptoms in this outbreak were abdominal pain, diarrhoea, fever, vomiting and flu-like symptoms (Table 1). The mean duration of illness was 3.6 days, median duration 2 days and range 1-24 days.

Four different foods served at the conference were significantly associated with illness by univariate analysis (Table 2); chicken drumsticks and ham, served at the buffet on 19 April; and green salad and coronation chicken served at the buffet on 20 April. The highest attack rates were for the coronation chicken and ham which were prepared by Foodhandler A. Using the Mantel-Haenszel test neither green salad nor chicken drumsticks were significantly associated with illness after controlling for the association with coronation chicken and ham. Coronation chicken was still significantly associated with illness after controlling for ham ($R^2 = 3$, 95% confidence intervals = 1.9-4.8, $P \ll 0.001$) but the strength of

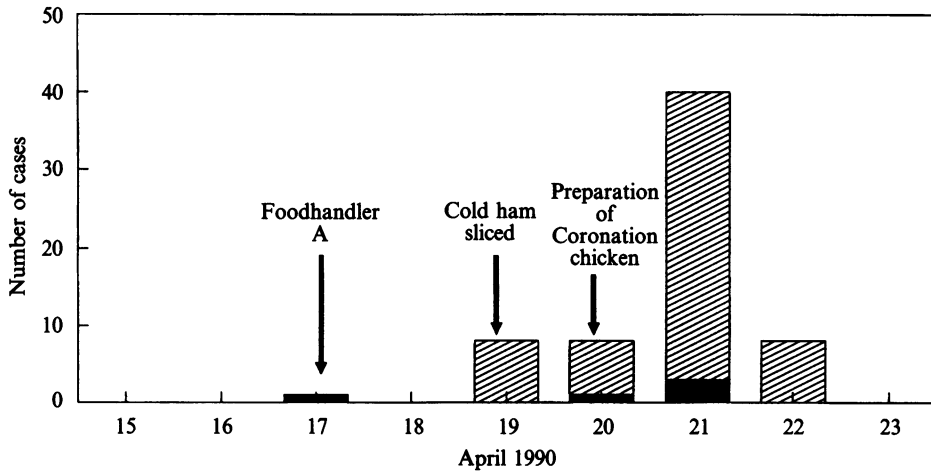


Fig. 1. Date of onset of cases in staff (■) and delegates (▨).

Table 1. Frequency of symptoms

Symptoms	Number (n = 67)	%
Appetite loss	61	91
Diarrhoea	55	82
Abdominal pain	52	78
Flu-like symptoms	50	75
Vomiting	49	73
Nausea	47	70
Fever	40	60

association with ham was reduced after controlling for coronation chicken ($R^2 = 1.5$, 95% confidence intervals = 1.0–2.5, $P = 0.05$).

Microbiology

Forty-three faecal samples were tested for bacterial pathogens; one yielded campylobacter. Of five faecal samples obtained from delegates and staff within 48 h of onset of illness SRSV were visualized by E.M. in two. There was no food available for testing.

DISCUSSION

The clinical and epidemiological features of this outbreak suggest that the agent was SRSV. Diarrhoea and vomiting was sudden, the incubation period was 24–72 h and SRSV was observed in 2 of the only 5 appropriate faecal samples obtained. Although SRSV illness is normally short lived, symptoms are often violent. Flu-like symptoms are commonly reported, as in 75% of cases in this outbreak.

SRSV gastroenteritis has emerged as one of the commonest foodborne infections [1]. In particular the contamination of raw or cold foods by foodhandlers has been shown to be responsible for large outbreaks associated with catering establish-

Table 2. *Attack rates for foods served at the conference*

	Ate (%)	Did not eat (%)	<i>P</i> value*	Relative risk	95% Confidence intervals
Wednesday 18 April 90					
Canapès	28/97 (29%)	39/164 (24%)	0.44	1.21	0.80-1.84
<i>Celery</i>	24/86 (28%)	41/171 (24%)	0.59	1.16	0.76-1.79
Sausage	27/81 (33%)	39/178 (22%)	0.07	1.52	1.01-2.30
Thursday 19 April 90					
Buffet					
Chicken drumsticks	41/128 (32%)	26/109 (24%)	0.03	1.66	1.08-2.55
Green salad	49/175 (28%)	17/86 (20%)	0.20	1.42	0.87-2.31
Tomato and chive salad	24/108 (22%)	42/150 (28%)	0.36	0.79	0.51-1.23
<i>Ham</i>	45/130 (35%)	21/132 (16%)	< 0.001	2.18	1.38-3.44
Vegetable pie	16/77 (21%)	66/183 (36%)	0.34	0.76	0.46-1.25
Coleslaw	17/76 (22%)	49/185 (26%)	0.59	0.84	0.52-1.37
<i>Coleslaw and rice</i>	44/163 (27%)	20/94 (21%)	0.38	1.27	0.80-2.02
Civic reception					
<i>Melon</i>	41/150 (27%)	26/113 (23%)	0.51	1.19	0.78-1.82
<i>Sole</i>	39/146 (27%)	28/117 (24%)	0.70	1.12	0.73-1.70
<i>Lamb</i>	42/152 (28%)	25/111 (23%)	0.42	1.23	0.80-1.89
Vegetables	42/148 (28%)	25/115 (22%)	0.28	1.31	0.85-2.01
<i>Chocolate roulade</i>	30/119 (25%)	37/142 (26%)	0.98	0.97	0.64-1.48
Cheese	21/80 (26%)	46/183 (25%)	0.97	1.04	0.67-1.63
Friday 20 April 90					
Buffet					
<i>Coronation chicken</i>	46/101 (46%)	21/162 (13%)	< 0.0001	3.51	2.23-5.52
Green salad	45/144 (31%)	20/114 (18%)	0.018	1.78	1.12-2.84
Vegetable quiche	26/98 (27%)	41/165 (25%)	0.88	1.07	0.70-1.63
<i>Potato salad</i>	35/115 (30%)	30/143 (21%)	0.11	1.45	0.95-2.21
Curried rice	37/124 (30%)	28/134 (21%)	0.13	1.43	0.93-2.19
Tomato and chive salad	38/108 (35%)	52/151 (34%)	0.99	1.02	0.73-1.43
Chicken and ham pie	19/63 (30%)	48/199 (24%)	0.43	1.25	0.80-1.96
Coleslaw	4/14 (29%)	63/249 (25%)	0.76†	1.13	0.48-2.66

The foods prepared by foodhandler A who was symptomatic on the 18th and asymptomatic on the 19th and 20th are in italics.

* χ^2 using Yates continuity correction.

† Fisher's exact test.

ments [5-7]. Washrooms used by infected staff have also been shown to be a source of infection for other staff either as a result of contamination by vomitus or by airborne infection [1, 11].

In this outbreak the analysis of the food specific attack rates identified two foods that were independently associated with illness; ham and coronation chicken, with the latter being most strongly implicated. Foodhandler A used her hands without gloves to slice the ham on 19 April the day after cessation of illness. The coronation chicken was prepared on the morning of 20 April when she was still symptom-free; she boned cooked chicken using bare hands. It is improbable that other serving staff were responsible for the outbreaks as none had served foods while ill or within 48 h of gastrointestinal illness.

These results suggest that Foodhandler A infected food at the conference despite being asymptomatic. Similar findings were reported by White and colleagues [5] in an outbreak affecting eight banquets for which food was prepared at a single restaurant. The food vehicles identified included food prepared by foodhandlers 24 h and 48 h after recovery from viral gastroenteritis. Reid and colleagues [6] investigated an outbreak in a hotel lasting 8 days and found that the main vehicle of infection was cold foods prepared by a foodhandler during and after a mild gastrointestinal illness; he was excreting SRSV particles 48 h after cessation of symptoms. They recommended that foodhandlers should be considered potentially infectious for at least 2 days after recovery from illness since lapses in personal hygiene could lead to contamination of food. Food Industry Medical Officers' Working Group challenged this advice arguing that 'an arbitrary period of exclusion of foodhandlers following recovery from gastroenteritis presents so many practical employment difficulties' [9]. Nevertheless recent guidance from the PHLS Salmonella Sub-Committee on exclusion of foodhandlers from work [8] has recommended that foodhandlers with gastroenteritis of unknown or viral origin should be excluded from school or work until 48 h after clinical recovery. Our findings support this recommendation.

The questionnaire used to investigate the outbreak invited those who were concerned about risk of SRSV infection to HIV positive people to telephone CDSC (Welsh Unit) for confidential advice. This had two main aims, to counsel worried delegates and to gain information on SRSV infection in HIV positive cases who might be at increased risk of serious illness [12]. Only one respondent volunteered he was HIV positive. His symptoms were severe abdominal pain, diarrhoea, nausea and vomiting, headache and flu-like symptoms, which persisted for only 2 days, with 3 days of normal activity lost.

Following this outbreak in-service training courses at the conference centre were made compulsory for all staff with disciplinary proceedings as necessary. The terms and conditions of service of the staff were also changed to make it compulsory that they would provide a stool specimen if required. It was also made compulsory that all the staff would report any episode of gastroenteritis. The success of such regimes in preventing outbreaks rests on the willingness of staff to report symptoms. The sometimes mild clinical features of viral gastroenteritis may make a decision to impose such strict control regimes appear to staff as excessive, and infected staff may continue to work while they have symptoms. However, SRSV can cause serious outbreaks and therefore such tough measures are justified.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the help given by Dr Owen Caul, Consultant Virologist, Bristol PHLS, during this investigation.

REFERENCES

1. Editorial. Norwalk agent comes of age. *J Infect* 1990; **20**: 189-91.
2. Murphy AM, Grohman GS, Christopher PJ, Lopez WA, Davey GR, Milson RH. An Australian-wide outbreak of gastroenteritis from oysters caused by Norwalk virus. *Med J Aust* 1979; **2**: 329-33.

3. Sockett PN, West PA, Jacob M. Shellfish and public health. *PHLS Microbiol Digest* 1985; **2**: 29-35.
4. Gill M, Cubitt WD, McSwiggan DA, Watney BM, Bartlett CLR. Epidemic of gastroenteritis caused by oysters contaminated with small round structured viruses. *BMJ* 1983; **287**: 1532-4.
5. White D. A foodborne outbreak of Norwalk virus gastroenteritis: evidence for post-recovery transmission. *Am J Epidemiol* 1986; **124**: 120-6.
6. Reid JA, Caul EO, White DG, Palmer SR. The role of an infected food handler in an hotel outbreak of Norwalk-like viral gastroenteritis: implications for control. *Lancet* 1988; ii: 321-3.
7. Inversen AM, Gill M, Bartlett CLR, Cubitt WD, McSwiggan DA. Two outbreaks of food-borne gastroenteritis caused by a small round structured virus; evidence of prolonged infectivity in a food handler. *Lancet* 1987; ii: 556-8.
8. Notes on the control of human sources of gastrointestinal infections, infestations and bacterial intoxications in the United Kingdom. Report of the Public Health Laboratory Service PHLS Salmonella Sub-Committee. *CDR* 1990. Supplement 1.
9. Food Industry Medical Officers' Working Group. Gastroenteritis in food handlers. *Lancet* 1988; ii: 909.
10. Rodriguez WJ. Viral enteritis in the 1980's: perspective diagnosis and outlook for prevention. *Pediatric Infect Dis J* 1989; **8**: 570-8.
11. Greenburg HB, Wyatt RG, Kapickian AZ. Norwalk virus in vomitus. *Lancet* 1979; i: 95-6.
12. Riordan T, Wills A. An outbreak of gastroenteritis in a psycho-geriatric hospital associated with a small round structured virus. *J Hosp Infect* 1986; **8**: 296-9.