

An outbreak of viral gastroenteritis associated with eating raw oysters

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Summary: *Nine members of a party of 24 people who attended a birthday party fell ill with gastroenteritis between one and three days later. A cohort study undertaken using a postal questionnaire showed that illness was associated with having eaten raw oysters. Six of the cases had their stools examined and two were positive for small round structured virus. The illness was brief and none of the cases had consulted a general practitioner. Had the cases not been part of a party they would not have been identified. The oysters were grown in English coastal waters in grade B oyster beds. They underwent depuration treatment before they were sold for consumption. More work is needed to protect oyster beds from contamination and to identify methods to render oysters safe for consumption.*

Key words:
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oysters

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Introduction

Twenty-four people attended an 80th birthday lunch party at a hotel in Sevenoaks on 15 February 1997. Some were local, others came from other parts of the country, the United States, Switzerland, and Denmark. On 19 February, a member of the lunch party reported to the Sevenoaks Environmental Health Department that several people who attended the lunch party had developed vomiting and diarrhoea soon afterwards. The host supplied a guest list, including addresses and telephone numbers. After several phone calls to those who were resident in the United Kingdom, a decision was taken to investigate the outbreak. Questionnaires were sent out to all of the guests, except for the lady whose birthday it was (to avoid upsetting her). The local environmental health departments of guests who lived in other parts of the country were notified to ask if they would take stool specimens from those who still had symptoms.

Investigation

A cohort study began on 20 February. The lunch menu was obtained from the hotel restaurant, outbreak questionnaires were posted, the kitchen was inspected, and the food handlers were interviewed on the same day.

A batch of frozen prawns and chantilly cream used for the party were still in stock. Samples were taken on 21 February and sent to the Ashford Public Health Laboratory (PHL) for microbiological examination.

Stool specimens collected from people with symptoms were sent to Ashford PHL for microbiological examination, from whence they were sent to Tooting PHL for virological examination.

The returned questionnaires were analysed using Epi Info 6.0.

Case definition

A presumptive case was defined as a person who attended the party on 15 February and who developed vomiting and or diarrhoea and at least one other gastrointestinal symptom within the next 72 hours.

Presumptive cases were said to be confirmed if small round structured virus (SRSV) was found in their stool.

Results

Environmental health officers inspected the kitchen and found it to be satisfactory. There were four food handlers. None was ill either before or after the party. None of them ate food served at the party. They had bought food from outside the hotel for lunch that day.

Microbiological examination of leftover food revealed no significant pathogen.

Twenty out of 24 questionnaires were returned (87% response rate). There were seven presumptive and two confirmed cases.

Eight of the nine who were ill reported nausea and shivering, and seven reported diarrhoea, vomiting, stomach pain, fever, and headache.

The incubation period, based on the interval between the time when the meal was eaten and the onset of illness ranged from one to three days with a median of two days.

Most of the cases were ill for between a few hours and two days. Another two cases reported being very sleepy for another two days after gastroenteritis symptoms had abated.

Oysters, smoked salmon, crab sticks, prawns, and lettuce garnish were served together as a platter. The alternative starter was a fruit plate of melon and raspberries.

The most significant associations with illness were the various items of food in the seafood platter (table

1). Food specific attack rates indicated that illness was most significantly associated with eating oysters, which were served raw. The attack rate for those who ate the oysters was 82% and was 0% for those who did not eat them ($p < 0.0007$). Lesser associations were found between illness and the consumption of other items of seafood in the seafood platter and with ice.

Laboratory results

Stool specimens were taken from six affected members of the party. Two specimens submitted on 19 February were found positive for SRSV by electron microscopy at Tooting PHL.

Source of oysters

Environmental health officers traced the oysters to a distributor in Surrey. On the basis that they were pacific oysters and from the period of supply, the distributor identified the source to be coastal waters of Kent where the oyster beds were a grade B standard at the time of the outbreak. Records of monitoring indicated that they were generally grade B but occasionally grade A or C. The oysters underwent depuration treatment in Canterbury before being released for consumption.

Discussion

The predominance of nausea and vomiting^{1,2}, the incubation period of one to three days with a median of two days^{1,2}, and the presence of the virus in the stool

of two cases supported the conclusion that the outbreak of food poisoning was caused by SRSV. Statistical evidence from food specific attack rates strongly suggested that the vehicle of transmission was raw oysters. Although illness was also associated with consumption of other items of seafood served with the oysters on the seafood platter, the associations were weaker and were probably due to confounding. The numbers were too small to stratify the data to confirm this. No oysters were left over for virological examination.

Outbreaks of food poisoning due to SRSV associated with consumption of raw oysters have been documented³ even if the oysters have undergone acceptable standards of purification⁴. This is because bacterial indicators are used currently to monitor shellfish quality, and as viruses are generally more hardy and more resistant to depuration than bacteria in a marine environment, the ability of bacterial monitoring to predict viral contamination in bivalve molluscs is limited⁵. Virus particles may be present in a mollusc's flesh even after depuration⁶. More recent studies using the polymerase chain reaction (PCR) on polluted field samples and on shellfish associated with outbreaks have demonstrated the presence of SRSV in them⁵.

Scientists are trying to develop better indicators of SRSV contamination of shellfish. Research is currently being carried out using male specific (F+) bacteriophages, which share many characteristics with

TABLE I Food specific attack rates

Food eaten	Ate food		Attack rate %	Did not eat		Attack rate %	p value*
	Ill	Not ill		Ill	Not ill		
First Course							
Oysters	9	2	82	0	9	0	0.0003
Smoked salmon	9	3	75	0	8	0	0.001
Crab sticks	9	3	75	0	7	0	0.001
Prawns	9	4	69	0	6	0	0.005
Lettuce garnish	8	4	69	0	6	0	0.005
Melon	0	2	0	9	56	0.47	
Raspberries	1	4	25	8	6	71	0.30
Main Course							
Duck with orange sauce	9	10	47	1	0	100	0.47
Mashed potato with spring onion ("champ")	5	5	50	1	5	57	0.31
Vegetable lasagne	1	0	100	8	10	44	0.47
Mixed vegetables	–	–	–	0	1	0	1.00
Deserts							
Apple tart	2	4	33	7	6	54	0.63
Raspberry pavlova	7	5	58	2	5	29	0.35
Mocha ice cream	1	0	100	8	10	44	0.47
Chantilly cream	1	3	25	6	7	46	0.60
Drinks							
Aperitifs	3	7	30	6	3	67	0.18
Wine	8	7	53	1	3	25	0.58
Liqueurs/port	0	2	0	9	8	53	0.47
Soft drinks	2	2	50	7	8	47	1.00
Water	6	7	46	3	3	50	1.00
Ice (added to drink)	4	0	100	5	10	33	0.03
Coffee	7	9	44	2	1	67	0.58
Cream	1	2	33	7	8	47	1.00
Tea	1	0	100	8	10	44	0.47
Milk	2	1	67	6	9	40	0.56

* Fisher's exact test

human viral pathogens of concern, including their rate of excretion from shellfish when compared with *Escherichia coli*. The Fish Disease Laboratory at Weymouth has studied the behaviour of these bacteriophages and *E.coli* during depuration of environmentally contaminated mussels and shown that both pathogens are found mainly in the intestine and digestive organs and that sequestration of the bacteriophages into non digestive tract tissue does not occur⁷. Clearance depends on digestive processes taking place rather than just defaecation. If this is so, then longer periods of depuration may render shellfish safe for human consumption.

Illness associated with SRSV infection tends to be of short duration, and most people do not consult their general practitioners. In this outbreak, none of the cases went to see a general practitioner. The outbreak would not have been noticed had the victims not known each other and realised that many of them had fallen ill after the lunch party.

The restaurant associated with the outbreak had been full the night before when a set menu – which included the same batch of oysters – was served as part of the St Valentine's Day dinner. No cases were notified, but a member of staff at Sevenoaks Council and her partner who were there had a similar illness after the dinner. They too did not see their general practitioner and would have escaped notice had it not been for this outbreak enquiry. Furthermore, hospital laboratories do not examine faeces for SRSV routinely. Even when virus examination is specifically requested, SRSV is difficult to identify unless specimens are taken in the first day or so of illness.

The true magnitude of the problem caused by SRSV associated with eating contaminated shellfish is probably much greater than is currently reported. More research is needed to develop effective methods to make raw oysters safe for consumption and more work needs to be done to protect oyster beds from marine faecal pollution.

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