

Rapid communications

A FOOD-BORNE OUTBREAK OF CRYPTOSPORIDIOSIS AMONG GUESTS AND STAFF AT A HOTEL RESTAURANT IN STOCKHOLM COUNTY, SWEDEN, SEPTEMBER 2008

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In September 2008, 21 cases of cryptosporidiosis occurred among guests and staff at a wedding reception in a hotel restaurant in Stockholm county, Sweden. The median incubation period was 7.1 days (range 4-9 days) and 86% of the patients had symptoms for longer than one week. Three patients were hospitalised due to dehydration. The most probable source of the outbreak was béarnaise sauce containing chopped fresh parsley.

On 19 September 2008, the Department of Communicable Disease Control and Prevention in Stockholm was alerted about an outbreak of gastroenteritis among guests who had attended a wedding dinner on 5 September at a hotel restaurant.

Among the 23 guests attending the dinner, 15 developed gastrointestinal symptoms between 9 and 14 September. When contacting the hotel restaurant it emerged that six out of eight members of the restaurant staff, who had eaten leftovers from the dinner menu, also had developed symptoms during the same period, and two of them were hospitalised. However, none of the staff reported any gastrointestinal symptoms around 5 September, when the dinner was served.

In total, 21 cases with gastrointestinal symptoms were identified in the outbreak. The median age of the cases was 34.4 years (range 10-82 years), nine were women and 12 were men.

Stool specimens from 26 individuals, 20 guests and six staff members, were analysed with standard techniques for bacterial pathogens as well as parasites. Sixteen cases were positive for *Cryptosporidium* species, twelve guests and four employees. None were positive for bacterial enteropathogens.

In order to identify the source of the outbreak, a retrospective cohort study was initiated.

Outbreak investigation

On 22 September, a questionnaire was sent to all guests inquiring about symptoms, as well as foods and drinks consumed. The guests were given the opportunity to answer the questionnaire via an enclosed paper copy or via a web-link. The staff received a similar questionnaire without the web-link. The response rate among guests and staff was 100%. Guests and staff were asked to deliver faecal samples for bacteriological and parasitological analyses.

A confirmed case of cryptosporidiosis was defined as an individual who had attended the dinner on 5 September at the hotel restaurant or at the staff restaurant and developed gastrointestinal symptoms, confirmed by the detection of *Cryptosporidium* oocysts in a stool sample by microscopic examination using the modified Ziehl-Neelsen stain.

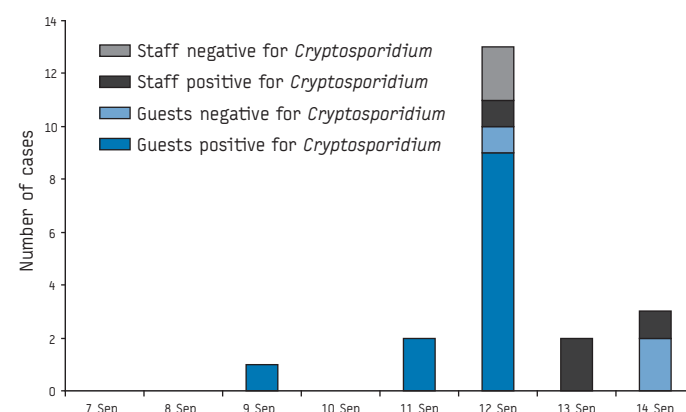
A probable case of cryptosporidiosis was defined as an individual who had attended the dinner on 5 September at the hotel restaurant or at the staff restaurant and developed gastrointestinal symptoms within 2-14 days.

The Figure shows the epidemic curve of the cases, 16 confirmed and five probable. The dates of onset of symptoms were between 9 and 14 September and the median incubation period was 7.1 days (range 4-9 days). The most common symptoms reported by the cases were diarrhoea (100%), abdominal pain (95%), nausea (86%), vomiting (38%), and fever >38°C (38%). Duration of symptoms lasted longer than one week for 18 people (86%). Three individuals were hospitalised due to dehydration.

There were two options for the main dish on the dinner menu. One was beef with béarnaise sauce, served with haricots verts rolled in bacon and baked potatoes, and the other option was salmon

FIGURE

Date of onset of symptoms among guests and restaurant staff in a cryptosporidiosis outbreak, September 2008, Stockholm County



served with asparagus, white wine sauce and boiled potatoes. The children were served hamburgers with chips and none of them developed intestinal symptoms. They were also negative for *Cryptosporidium* in faecal samples. A cake, which was eaten by all the guests but not by the staff, was served as dessert. Food and drink histories, based on the menu items consumed, indicated that the béarnaise sauce was the most probable source of the outbreak with a relative risk of 4.00 (95% confidence interval (CI): 1.14-14.09). The sauce had been prepared during the afternoon of the day it was served, and the ingredients were: eggs, butter, onion, vinegar and dried tarragon. The last item added to the sauce, after the heating, was chopped fresh parsley. No other food or drink item was associated with any significant risk. All tap water was obtained from the community network.

The 16 faecal specimens that were positive for *Cryptosporidium* oocysts were further analysed by polymerase chain reaction (PCR). PCR products were obtained from 13 of those samples. The *Cryptosporidium* genotype was determined by PCR-restriction fragment length polymorphism (RFLP) as described previously [1] and showed that all 13 individuals were infected with *Cryptosporidium parvum* (Marianne Lebbad, personal communication).

A project on sub-genotyping of all isolates is ongoing and may provide some information of which subtype that was involved in this outbreak.

The local environmental health office was contacted and an environmental health officer inspected the restaurant kitchen. Only minor errors in food handling were identified. No food items were sampled because too much time had elapsed between the dinner and the time of inspection. The fresh parsley had been imported from Italy in plastic bags and was not rinsed before use.

Discussion

Cryptosporidiosis has since the 1980s been increasingly recognised as a common cause of gastrointestinal infection in humans worldwide [2,3]. The two most common causes of human cryptosporidiosis are *Cryptosporidium hominis*, which is considered to be pathogenic primarily to humans, and *C. parvum*, which is zoonotic [4]. Humans become infected when they ingest *Cryptosporidium* oocysts. Ingesting as few as 9-100 oocysts can cause an infection [2].

Outbreaks of cryptosporidiosis are mostly associated with water, both drinking water and recreational water use, partly due to the resistance of the oocysts to chlorination at the levels used for water disinfection [1-5]. In Sweden, outbreaks of cryptosporidiosis are rare. However, in August 2002 there was a swimming pool-associated outbreak in Stockholm county, affecting approximately 800-1,000 people and with a secondary attack rate of 8-10% [1].

Worldwide, food-borne outbreaks of cryptosporidiosis occur less frequently. In a few reports, the source of infection were fruits or vegetables that had been in contact with contaminated water or manure, as well as unpasteurised apple juice [2,3]. Only rarely has an outbreak of cryptosporidiosis been linked to a food handler [6].

We describe the first documented outbreak in Sweden of cryptosporidiosis associated with food, comprising 16 confirmed cases and five probable cases. Even though no food samples were

analysed for parasites or bacteria, the epidemiological investigation strongly suggests that the béarnaise sauce, containing chopped fresh parsley which was added after heating, was the source of the outbreak. The sauce was heated to a maximum temperature of 80°C: if a higher temperature is reached there is a risk that the different ingredients will curdle. Since the parsley was added after the heat treatment procedure, we speculate that this fresh ingredient of the sauce was the most probable vehicle. Vegetables have in recent years been associated with several food-borne outbreaks of intestinal infections, which further emphasises the importance of standard recommendations for hygienic control measures to ensure the safety of fresh produce.

It can of course never be excluded that a food handler was the cause of contamination. However, as none of the staff reported any symptoms around the day when the dinner was served, we believe that they were victims, as the guests, rather than vehicles. In addition, faecal samples from asymptomatic staff members were all negative for *Cryptosporidium*.

Cryptosporidiosis has been a notifiable disease in Sweden since 2004 and approximately 50-100 cases are reported each year; in comparison, 7,960 cases were reported in the European Union countries in 2005 [5]. However, the reported data are likely an underestimate of the cryptosporidiosis burden. The infection is fairly unknown among Swedish physicians and most laboratories do not test for *Cryptosporidium* unless specifically requested. Special staining like modified Ziehl-Neelsen is often needed, and therefore many cases are probably undiagnosed.

In Stockholm county, four outbreaks of cryptosporidiosis, involving about 50 individuals, have been identified in the past two years. The number of sporadic cases also seems to increase. Clinicians should therefore be aware of cryptosporidiosis as a possible outbreak aetiology and consider performing routine stool tests for *Cryptosporidium* in patients with watery diarrhoea and abdominal pain.

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