

ORIGINAL ARTICLES

Outbreak report

LISTERIA OUTBREAK ASSOCIATED WITH SANDWICH CONSUMPTION FROM A HOSPITAL RETAIL SHOP, UNITED KINGDOMSJ Dawson¹, MRW Evans², D Willby³, J Bardwell³, N Chamberlain³, DA Lewis⁴

An outbreak of listeriosis occurred in the Swindon area of the UK in autumn 2003. Five cases were detected in pregnant women. Four of these women were thought to have eaten prepacked sandwiches from a retail outlet in one particular hospital. Sampling at the supplier detected *Listeria monocytogenes*, which was indistinguishable on molecular testing from the patients' isolates. Recent changes in UK food legislation should help diminish the risk of further outbreaks/cases such as ours occurring.

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Listeria monocytogenes is an uncommon cause of illness in the general population [1]. The annual incidence in European Union countries is 2-10 cases per million population [2]. In some groups (the immunosuppressed, neonates, pregnant women and their unborn children), it can be an important cause of life threatening bacteraemia and meningoenzephalitis [1,3].

Outbreaks of listeriosis have most often been related to a food source [4-11]. Because of this risk, pregnant women in the UK are advised to avoid certain foods, such as camembert, brie, chèvre, blue cheeses and pâté [12]. We describe an outbreak in pregnant women that appeared to be linked to consumption of prepacked sandwiches.

Epidemiology investigation and control measures

A cluster of five cases of listeriosis in pregnant women and/or neonates was identified over a two month period in the autumn of 2003. These occurred in Swindon (situated in southern England) and the nearby town of Gloucester (approximately 45 km away). One of the patients gave birth in Blackpool, a town in the northwest England, but usually lived in Swindon. None of the cases was fatal. Details are given in the table below.

Epidemiological information of cases of Listeriosis

When the two index cases were reported, interviews were carried out by Environmental Health Officers (EHOs) using a standard food and travel history questionnaire. The isolates of *Listeria monocytogenes* were sent for typing to the Health Protection Agency's Food Safety Microbiology laboratory (HPA FSML) in Colindale, London, and were found to have indistinguishable profiles (serotype, phagetype, and genotype).

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Two further cases were then detected in the Swindon area, and so investigations to find a common source continued. A second questionnaire was used, asking in more detail about the types of food eaten within the three months before onset of illness. These revealed that, apart from shopping at major supermarket chains, the only other similarity was that three of the patients had eaten prepacked sandwiches from a single retail outlet within the Great Western Hospital, Swindon which they had attended for antenatal appointments, and a fourth patient had probably eaten them on previous antenatal appointments. This fourth case thought she had eaten them but could not be 100% certain due to the long time period asked in the questionnaire and difficulty remembering.

The EHOs visited the outlet and found sandwiches sold during that period had come from two national suppliers and one local supplier. Daily temperature records for all the refrigerators and between pack of sandwiches measurements had been kept, and the refrigeration records were unremarkable. However, the outlet's contract with the local supplier had just been terminated and these sandwiches were no longer available for purchase in the hospital.

An outbreak meeting was held and the following actions were taken: active surveillance was initiated by alerting local Consultants in Communicable Disease Control (CsCDC) and microbiology departments, the outbreak was reported in the national communicable disease epidemiological bulletin (*CDR Weekly*), [13] and the HPA FSML at Colindale was contacted to find out whether any isolates with a similar profile had recently been identified. Case 5 was notified by the local microbiologist and, at the same time, information was supplied by FSML that this was a similar isolate (by typing). Healthcare workers working with pregnant women and neonates in the Swindon area were alerted to the outbreak and the local population was informed via the media (newspaper, radio and television coverage).

The EHOs visited the premises of the local sandwich supplier, and samples of food and environmental swabs were taken for microbiological testing for *Listeria*. A sample from a brie and cranberry sandwich grew *Listeria monocytogenes*, as did environmental samples from the premises (chopping boards, sink plug holes and cleaning sponge). On further serotyping and molecular testing, these were shown to be indistinguishable from blood culture isolates from all the patients at the HPA FSML. They were all typed as serotype 1 / 2, phage type Y, Amplified Fragment Length Polymorphism (AFLP) type III and were indistinguishable by pulsed field gel electrophoresis (PFGE) using *AscI*, a rare profile in the UK.

This sandwich supplier voluntarily closed down in order to clean the premises thoroughly. The EHOs also visited the supplier that provided meat and cheese for this sandwich maker. Samples were taken but none yielded listeria.

The hospital retail outlet was given advice about the future purchase of sandwiches (see discussion).

TABLE

L. monocytogenes, Swindon, United Kingdom, 2003

Case number	Time interval between cases (from DOB of index case)	Symptoms of mother	Sites where <i>L. monocytogenes</i> was recovered	Gestation of baby at time of delivery	Hospital in which baby delivered
1	0	Fever	Mother: blood culture Baby: nose and ear swabs	36 wks	Blackpool
2	-3 days	Fever with flu-like symptoms Previous week had diarrhea and vomiting	Mother: blood culture	Term	Swindon
3	+34 days	Unwell, fever	Mother: blood culture	Twins born at 29 weeks + 2 days	Swindon
4	+33 days	Fever	Mother: blood culture Baby: blood culture	26 wks	Swindon
5	-20 days	Nil in mother (Breathing difficulty in baby)	Mother: vaginal swab Baby: blood culture	37.5 wks	Gloucester

Discussion

Listeriosis is not a notifiable disease in the UK, and so it can be difficult to recognise outbreaks early. This outbreak was detected because most of the patients (four out of five) presented to the Great Western Hospital in Swindon or had a link with it. A recent survey of European countries showed that surveillance systems are in operation in 16 of the 17 countries surveyed and that in 10 of these countries the infection is statutorily notifiable [2]. If cases of listeriosis were made notifiable in the UK, all known cases would be reported, which would help to detect outbreaks where cases are scattered throughout the UK.

The incubation period for listeriosis can be long (between 3-70 days) [14] and the food questionnaires used in our outbreak investigation had to cover a period of several weeks. The patients may therefore have had difficulty remembering exactly what they had eaten during this period. A link was, however, established for three of the cases (and possibly a fourth) - these patients all remembered eating prepacked sandwiches bought from a retail outlet in the hospital. No link was found for the fifth case. Two previous outbreak reports have found an association with sandwiches supplied by external contractors within hospitals [15,16]. In Cardiff [15], two cases of listeria septicaemia occurred in immunosuppressed patients who were day cases in the hospital on the same day, and the only food link found was that both had eaten commercially prepared sandwiches supplied by the hospital. These sandwiches were sampled and grew *L. monocytogenes* with serogroup, AFLP type and phage type all indistinguishable from the patients' isolates. Similarly, four cases of listeriosis occurred in and around the city of Newcastle in a two month period [16]. This outbreak was traced back to a caterer who provided sandwiches for the hospital shop. In our outbreak and the outbreaks in Cardiff and Newcastle [15,16], patients who were at risk (that is, immunocompromised or pregnant) visited the hospital and obtained food that was contaminated with *Listeria*. We consider that providers of food to places with higher than average concentrations of people with lowered immunity, such as hospital retail outlets, should be made aware of the need for the highest possible standards of food hygiene. In January 2006 new food hygiene legislation came into force in the UK enacting EC Regulations. The new guidelines [17] recommend that food businesses manufacturing ready-to-eat foods, which could pose a risk to public health through the presence or growth of *L. monocytogenes*, should monitor processing areas and equipment for the presence of this organism as part of their sampling plans. In our outbreak and in others [10,11], the environment was shown to be contaminated and may have led to product contamination. The guidelines also recommend that if

the food is to be stored before consumption (that is, if it has a shelf life) then *L. monocytogenes* should not exceed 100 cfu/g during this period. If this level cannot be guaranteed, then it should be absent from 25 g when it leaves the food business operator. We hope that these new guidelines will prevent outbreaks such as the one described here.

In conclusion, we report an outbreak of listeriosis that occurred in pregnant women and was associated with the consumption of prepacked sandwiches (ready-to-eat food) from a hospital outlet. However, recent changes in the UK food legislation, if enforced, should diminish the risk and help prevent further cases/outbreaks occurring in similar circumstances.

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