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Outbreak of *Listeria monocytogenes* in an oncology unit associated with sandwiches consumed in hospital

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Summary In May 2003, two adult patients in an oncology unit were diagnosed with listeriosis, and sandwiches consumed in the hospital were identified as a common risk factor. Both patients were infected by the same strain of *Listeria monocytogenes*. Sandwiches collected from the hospital and external sandwich producer, as well as sites within the manufacturing environment, were contaminated by the same strain of *L. monocytogenes*. Sandwiches consumed in other hospitals have been associated with small clusters of listeriosis patients in the UK. This report describes the investigations following diagnosis of the two infections, and highlights a more general problem with sandwiches sold in hospitals.

Introduction

The bacterium *Listeria monocytogenes* and the disease listeriosis were first recognised in laboratory animals in Cambridge in 1924.[1] Later it became apparent that the disease affects humans. The increased number of reported cases during the 1980s in several countries together with evidence for foodborne transmission has renewed interest in this disease. It most often affects the unborn and newly delivered as well as the immunocompromised and elderly, but can occur in healthy individuals. Listeriosis primarily

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presents as abortion, septicaemia or infections of the central nervous system, with a high case fatality rate.[2] Although the numbers of reported cases declined during the 1990s, there has been a recent increase in England and Wales and in other European countries.[3,4] This increase has predominantly occurred in patients aged >60 years with severe underlying illnesses.

Although listeriosis is usually acquired from consumption of contaminated food, the epidemiology is complex. The ubiquitous nature of the bacterium and the wide range in incubation periods (from 1 to >90 days) between consumption of contaminated food and onset of disease mean that investigations to identify specific food vehicles are problematic.[5] *L. monocytogenes* presents a potential hospital infection problem because of the possibility of cross-infection between neonates in delivery suites as well as via the consumption of contaminated food in hospital.[2,6,7] Sandwiches consumed in hospitals have been associated with three small clusters of listeriosis patients in the UK.[8,9,17]

In May 2003, two patients in an oncology unit were diagnosed with listeriosis, and sandwiches were identified as a common risk factor. This report describes the investigations following the diagnosis of these infections, and highlights a more general problem with sandwiches sold in hospitals.

Methods

Surveillance of listeriosis was derived from routine data generated by national surveillance activities (National Public Health Service for Wales, and HPA, unpublished data). Isolates of *L. monocytogenes* were identified in the national reference laboratory (HPA Centre for Infections, London) by phenotypic tests including the use of the API Listeria identification kit.[10] Strains were characterised by serotyping, phage typing, DNA amplified fragment length polymorphism, and DNA pulsed-field gel electrophoresis.[11–15] Food analysis was performed using standard methods.[16]

Description of outbreak

In the last week of May 2003, *L. monocytogenes* was isolated from blood cultures taken from two patients in an oncology unit, but nursed on different wards, within two days of each other. Both patients had advanced malignancy and were receiving palliative chemotherapy. One was a female aged 46 years with disseminated adenocarcinoma of the right ovary, admitted with a high temperature, confusion and cerebellar symptoms. She was treated with amoxicillin and gentamicin for two weeks. She made a good recovery and was sent home. Following a further course of chemotherapy, she was readmitted a week later with hypothermia and hypotension and died within 24 h. The second patient was a female aged 63 years with recurrent, progressive, metastatic breast carcinoma, admitted with pyrexia, lethargy, weight loss and loss of appetite. Treatment with ampicillin was commenced but she died within a week. She was not treated with gentamicin as she had severe renal impairment. Since listeriosis is unusual (the total number of reported human listeriosis cases in Cardiff between 1995 and 2002 was three) the cases were reported to the Consultant for Communicable Disease Control (CCDC).

Epidemiological analysis

An outbreak control meeting was called by the CCDC on 13 June 2003. Subtyping and national surveillance data for human listeriosis in England and Wales as well as subtyping results on *L. monocytogenes* was requested. Complete typing results were available on 9 July 2003 and showed that the two blood culture isolates were indistinguishable and were designated as serovar 1/2a, phage type Y, AFLP type XI, and PFGE type L.

The first possibility considered by the outbreak control team was of a coincidental finding since both patients were severely immunosuppressed as a result of their advanced malignancies and so at increased risk of listeriosis. However, since listeriosis is rare, even in these types of patients, the occurrence of two such cases linked closely in place and time would occur very rarely by chance. The second possibility was of cross-infection between patients. This was considered unlikely since person-to-person spread has not been described except during the neonatal period.[5,6] Cross-infection was also unlikely since the patients were nursed on separate wards and had no direct contact with each other. The final possibility was exposure to a common source, and since listeriosis is predominantly a foodborne disease, the most likely common risk factor was contaminated food.

Environmental health officers (EHOs) investigated food consumption histories for the patients. Unfortunately one of the patients died before she could be interviewed, but the next of kin was eager to help, so the same EHOs interviewed the second patient and her partner and the relative of the patient who had died.

One week prior to admission, both patients attended the same outpatients department and had eaten sandwiches provided by the hospital (one was a ham salad and the other a tuna salad). This