Journal of Hospital Infection (2009) 73, 121–128

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Prolonged hospital and community-based listeriosis outbreak caused by ready-to-eat scalded sausages

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Received 1 December 2008; accepted 14 June 2009
Available online 28 August 2009

KEYWORDS
Foodborne outbreak;
Hospital;
Immunocompromised patients;
Listeria monocytogenes;
Meat products;
Pulsed-field gel electrophoresis;
Ready-to-eat

Summary *Listeria monocytogenes* is a foodborne bacterial pathogen. Immunocompromised patients are at higher risk of developing invasive listeriosis with high fatality rates. After notification of two patients with Listeria that had stayed in the same hospital (hospital A) before the onset of infection, we began an investigation to ascertain the extent of the outbreak, identify its source and prevent further infections. We conducted active case finding by contacting hospital A, reviewing medical records and retrospectively investigating listeriosis notifications from the German surveillance system (SurvNet). The kitchen (hospital A) and its meat supplier (company X) were inspected and environmental and food samples were taken for microbiological testing. All isolates of *L. monocytogenes*, together with patient and food-related isolates from Baden-Württemberg

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0195-6701/$ - see front matter
doi:10.1016/j.jhin.2009.06.011

2006 to 2008, were characterised by pulsed-field gel electrophoresis (PFGE). Altogether, 16 cases of listeriosis were identified. Serotype 4b with the indistinguishable PFGE patterns (*Asc*I 17a/*Apa*I 10) was detected from nine patients, five environmental and three ready-to-eat scalded sausage samples from company X, and two food samples from hospital A. All 11 patient cases linked to hospital A were immunosuppressed and were regularly served food during their hospital stay. Ten of these patients received corticosteroids and proton pump inhibitors (PPIs). Five cases were fatal. Our investigations indicate that ready-to-eat scalded sausages from company X caused this outbreak of listeriosis. Hospital food suppliers should guarantee the absence of *L. monocytogenes* in ready-to-eat meat products, controlled through optimised quality assurance.

Introduction

Listeria monocytogenes is a foodborne bacterial pathogen, which is ubiquitous in the environment. Human infection usually occurs via contaminated food items such as cheese or other milk products, smoked fishes, meat products and salads.[1] Although listeriosis is a relatively rare foodborne disease, it is life-threatening and has a fatality rate of 9–30%.[2–4] The ability of this bacterium to survive and grow under anaerobic conditions as well as refrigerator temperatures, and its high tolerance to salt, allow it to thrive in food-processing environments.[5] The diversity of food items with a risk of *L. monocytogenes* contamination and the prolonged incubation period of the disease (3–70 days) make the identification of food vehicles difficult. Most listeriosis cases are believed to occur sporadically, but foodborne outbreaks are reported regularly. In healthy people *L. monocytogenes* infection usually presents as diarrhoea or flu-like symptoms.[1,6] Immunocompromised patients with a malignancy, an autoimmune disease or diabetes mellitus are at higher risk of invasive listeriosis, likely to develop into septicaemia, meningo-encephalitis and death.[7] Other risk groups are pregnant women and their unborn children or newborns. *L. monocytogenes* infections can cause premature delivery, miscarriage, stillbirth, or serious health problems for the newborn.[1] An increase in the number of listeriosis cases has been observed in Germany and several other European countries since the year 2000.[3,8,9] The increase mainly occurred in non-pregnancy-related listeriosis, which could be an effect of the diet recommendations pregnant women receive in order to limit their listeriosis risk, the demographic trend of an ageing population and of the increasing trend to ready-to-eat food. In Germany, invasive listeriosis is mandatorily notifiable by the diagnosing laboratory.

In October 2007, one local health office in Baden-Württemberg reported that two patients had stayed in the same hospital (hospital A) before the onset of listeriosis. Consequently, we started investigations to confirm the outbreak and ascertain its extent, identify the source and prevent further infections.

Methods

Case finding

We conducted active case finding by contacting hospital A and by retrospectively investigating notified listeriosis cases in the German state of Baden-Württemberg (10.8 million inhabitants) to determine if they had stayed in hospital A and other hospitals for any length of time during the four weeks before onset of their symptoms. In order to find further non-hospital-related listeriosis cases (community-based) we collected and typed all human *L. monocytogenes* isolates available from the Laboratory of the Baden-Württemberg State Health Offices and the National Consulting Laboratory for human *L. monocytogenes* for the years 2006 to 2008. Available isolates from patients of hospital A were also typed by pulsed-field gel electrophoresis (PFGE). In addition, we collected and typed all available *L. monocytogenes* strains from Baden-Württemberg, which were isolated from food by the food safety authorities. We compared all typed isolates with the food listeria PFGE research database available from the