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Salmonella Kottbus outbreak in infants in Gran Canaria (Spain), caused by bottled water, August – November 2006

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Introduction

Since October 2006, the Spanish National Reference Laboratory has reported a series of isolations of *Salmonella* Kottbus on the island of Gran Canaria [1]. The fact that most of the cases were in infants under one year of age and needed hospitalisation, caused significant concern among the general public. Information published in the media contributed to this alarm.

Outbreaks due to this *Salmonella* serotype are rare in the literature with only five outbreaks published since 1959 [2-6]. No cases of *Salmonella* Kottbus had been isolated and reported in Spain since 1996 [7,8]. We decided to conduct epidemiological and environmental studies to describe the characteristics of the cases and to determine the possible source of infection.

Methods

During October and November 2006, we actively searched for and collected information on cases. We designed a matched case-control (1:2) study that was conducted while cases were still occurring. A case was defined as an infant under one year of age with gastroenteritis and with laboratory confirmed *Salmonella* Kottbus. Controls were selected from among healthy children that had visited the same paediatrician as the cases for a regular consultation, and were matched by age, sex, date of consultation and address.

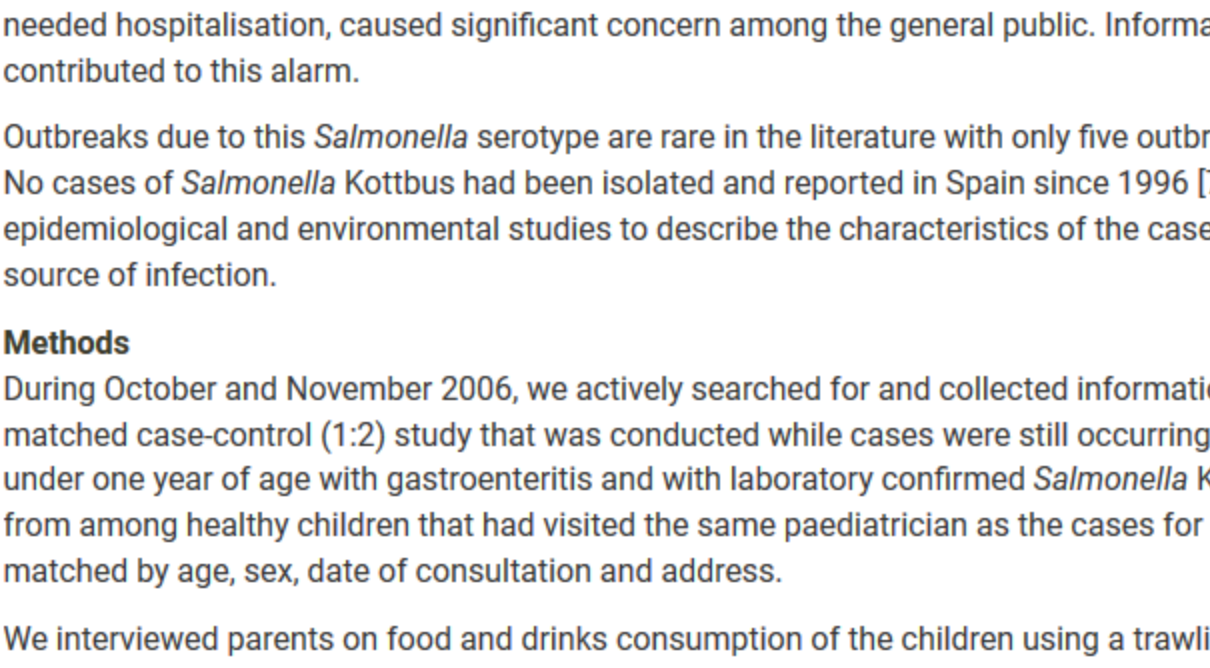
We interviewed parents on food and drinks consumption of the children using a trawling questionnaire including questions about breastfeeding and consumption of vegetables, dairy products, meat, fish, etc. To identify risk factors, bivariate analysis and conditional logistic regression were used to calculate crude odds ratios (OR) and Mantel-Haenszel odds ratios (MH-OR).

Results

Of 46 identified and confirmed cases, 41 were included in the study and the rest declined to participate or were not found. The average age was five months (95% CI 2.5-7.5), and 27 of those 41 cases (66%) were male. Nineteen cases (46%) had underlying diseases or were immunocompromised (e.g. previous infectious diseases, neurological pathologies, and newborn pathologies such as as gastric reflex, lactose intolerance, low birth weight, premature birth, etc.). The geographical analysis showed that the cases were distributed along the island following one of the main highways (Figure 1).

FIGURE 1

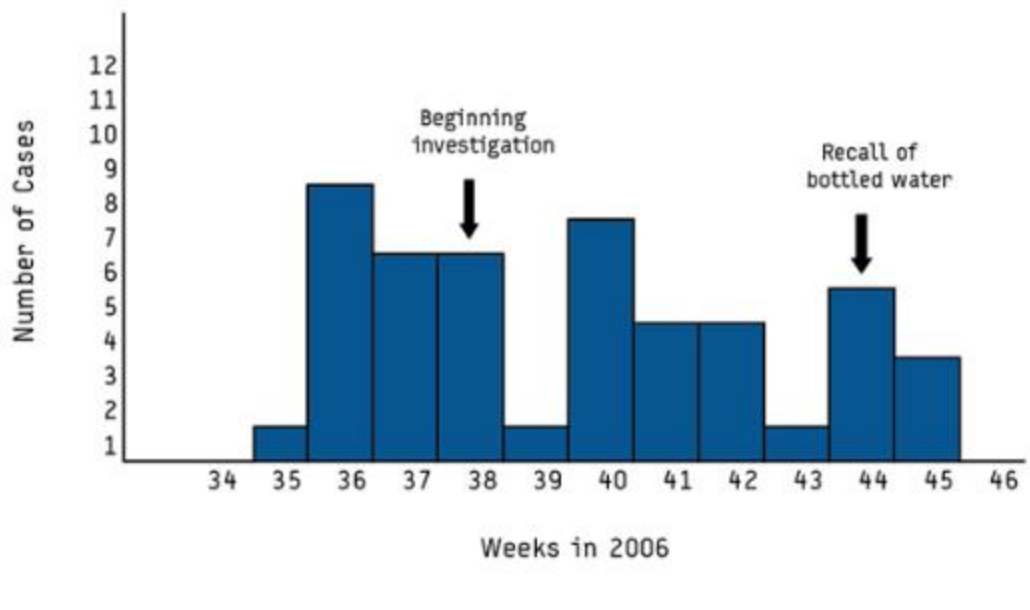
Spatial distribution of *Salmonella* Kottbus cases, Gran Canaria, Aug-Nov 2006



All cases occurred in 2006 between weeks 34 and 45. The epidemic curve suggested a continuous common source (Figure 2).

FIGURE 2

Cases of *Salmonella* Kottbus by onset of symptoms, Gran Canaria, Aug-Nov 2006 (n=46)



The case-control analysis identified a statistically significant association with the consumption of locally produced bottled water (without gas) (OR=8.04; 95% CI 2.24-43.3) and natural fruits (OR=0.04; 95% CI 0.005–0.44). The conditional logistic regression showed an MH-OR of 36.3 (95% CI 3.18-414.4) for water consumption, adjusting for age, sex, date of consultation, address and fruit consumption.

A carrier pigeon loft was found near one water reservoir of the local factory and we could verify that pigeons frequented this reservoir. Microbiological and environmental analysis detected *Salmonella* Kottbus in bottles randomly selected from markets, and also in the local factory where the water was bottled. Moreover, *Salmonella sp.* was detected in the pigeons.

Discussion and conclusion

This is the first published outbreak of *Salmonella* Kottbus associated with commercial bottled water in Spain and Europe. A significant proportion of patients had concomitant diseases, which may explain why this group was affected so strongly.

The spring may have been contaminated by pigeons that used the water deposit as a watering place.

The implicated brand of water was for local distribution only and was sold in different supermarkets on Gran Canaria. As a consequence of the investigation, the factory was closed down, all supermarkets were informed and the bottled water was recalled. Public Health authorities inspected the markets over several days to verify the recall.

In future studies we suggest the inclusion of bottled water as a possible source of *Salmonella* infection, especially in certain risk groups, and to consider including detection of *Salmonella* in water controls.

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