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AN EPIDEMIC OUTBREAK OF *SALMONELLA TYPHIMURIUM* IN A ROMANY ETHNIC COMMUNITY – A CLINICAL-EPIDEMIOLOGICAL SURVEY

Liliya Pekova

Department of Infectious Diseases, Medical Faculty, Trakian University, Stara Zagora, Bulgaria

SUMMARY – An epidemic outbreak in October 2005 in a Romany community associated with consumption of minced meat, produced and sold by a private manufacturer without any sanitary surveillance is reported. *Salmonella typhimurium* was confirmed as an etiologic agent. The aim was to study the clinical and epidemiological findings in this outbreak. The study group included 40 Romanies, 15 male and 25 female, aged 2 to 77 years. Clinical, laboratory, microbiological and epidemiological investigations were performed. Twenty two (55%) patients had clinical manifestations such as prostration, fever and diarrhea. A mild clinical form was observed in 6, moderate form in 9 and severe form in 7 patients. Eighteen (45%) patients were asymptomatic. Most patients had typical clinical presentation, whereby moderate and severe forms prevailed. Using foodstuffs beyond sanitary control is quite possible in a Romany community because of poor living conditions and low health education.

Key words: *Bacterial infections – epidemiology; Salmonella food poisoning – etiology; Salmonella typhimurium – microbiology; Food contamination; Bulgaria*

Introduction

Salmonellae are wide-spread enteric infections throughout the world. These pathogens make a great group of microorganisms allocated to the genus *Salmonella*, family *Enterobacteriaceae*[1-3]. The clinical presentation varies from subclinical forms to severe disease. Sporadic cases and epidemics have been recorded at different sites[1-6]. Cattle, poultry and rodents are the sources of infection, however, *Salmonella (S.) typhimurium* is also transmitted by inter-individual route[6,7]. As a rule, the disease develops upon ingestion of contaminated foodstuffs such as meat, fish, milk, eggs, sausages, etc.[8,9]. Studies by Bulgarian authors show that *S. typhimurium* is one of the most frequently isolated Salmonellae in southern Bulgaria[10,11].

The aim of the study was to evaluate the characteristic features of an epidemic outbreak of *S. typhimurium* in a Romany community.

Correspondence to: *Asst. Prof. Liliya Pekova, MD*, Medical Faculty, Trakia University, 11 Armeyska Str., 6000 Stara Zagora, Bulgaria
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Materials and Methods

Forty patients, 15 male and 25 female, aged 2 to 77 years (mean age ± SD 43.7±12.8), all of them Romanies living in Stara Zagora, Bulgaria, were included in the study (Fig. 1). The study was conducted from November 9 to November 20, 2005. Twenty two patients had typical clinical presentation and underwent medical examination. Six patients were hospitalized at Department of Infectious Diseases, Stara Zagora Regional Hospital, where laboratory tests were performed.

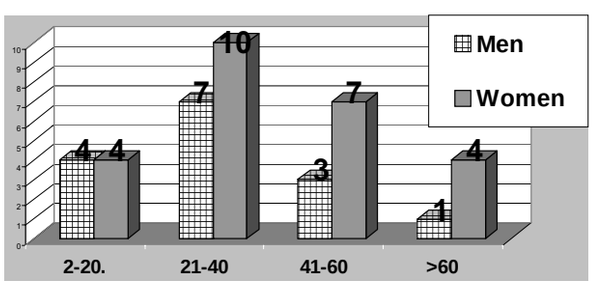

Fig. 1. Sex and age (years) distribution of patients.

The source of infection, the vehicles of infection transmission and the size of the center of infection were carefully investigated. A questionnaire was used to enter patient demographic data, use of foodstuffs beyond sanitary surveillance, contacts with patients having diarrhea syndrome, and travel to other regions in the country. The patients were interviewed at home or at Department of Infectious Diseases.

Results

Twenty two patients (55%) were examined at outpatient clinic of the Department of Infectious Diseases, Stara Zagora Regional Hospital in Stara Zagora, Bulgaria, during the period from November 9 to November 12, 2005. They all experienced sudden illness with abdominal pain, fever and chills, vomiting, diarrhea and prostration. Six of them were hospitalized, while the others were treated as outpatients either for the lack of health insurance or because of the mild clinical form of illness. The signs and symptoms of the illness developed within 4-10 hours (5.7±2.8) of consumption of meat-balls made on the same day. The minced meat was bought from a neighbor shortly before.

All 22 (55%) patients with clinical manifestations of salmonellosis complained of prostration. In 18 (45%) of them, body temperature varied from 37.2 to 39.1 ºC (37.5±2.5). The onset of the disease included dyspeptic syndrome. Sixteen (40%) patients had diarrhea, i.e. loose watery yellow-green stool with mucus, of sour-putrefactive smell three to 12 times a day. The signs and symptoms observed in study patients are shown in Table 1.

The six hospitalized patients were febrile, with reduced elasticity and turgor of the skin. Five of them had dry mouth and white-coated tongue. The abdomen was diffusely painful on palpation. The most painful zone was in the middle of the abdomen and hypogastrium. Peristalsis was quick. Tachycardia corresponded body temperature; heart rate 110-128/min and hypotonia 100/60-80/50. In all these patients, clinical presentation was indicative of a severe form of salmonellosis.

The blood leukocyte count was moderately raised up to $22.5.10^6$/L in four patients, with the appearance of young cells. Decompensated metabolic acidosis occurred in all these patients. Monitoring of serum electrolytes showed decreased levels of K^+ and Na^+ in three patients. The diagnosis was verified microbiologically in all hospitalized patients. They were treated with ciprofloxacin according to the microbiological sensitivity report, along with appropriate intravenous fluid and electrolyte replacement. All patients were negative for *S. typhimurium* at discharge from the hospital. Clinical forms of the disease are presented in Fig. 2.

The epidemiological survey included 40 Romanies. Minced meat of mixed pork and veal was specified as the source of infection. This minced meat was manufactured at a small cattle-breeding farm 2 months before. The owner was a Gipsy, member of the study community. The animals were in good health. The meat was in cold storage. Two weeks before the epidemic outbreak, the refrigerator got out of order and because of it the family decided to sell the rest of the minced meat. It was sold at a low price at the owner's home. Practically the whole neighborhood bought some minced meat, fried meat-balls and ate them on the same evening. It was impossible to evaluate the organoleptic qualities of the minced meat for the presence of microorganisms. A part of the minced meat was confiscated for microbiological testing, and the whole amount was placed under interdiction. Microbiological analysis was positive for *E. coli*, *S. aureus*, *S. typhimurium* and *P. vulgaris*. Eighteen (45%) patients were symptom-free.

Table 1. Clinical manifestations of salmonellosis

Symptom	Number of patients	%
Asthenia	22	55
Temperature	18	45
Myalgia	11	27.5
Arthralgia	7	17.5
Headache	17	42.5
Abdominal pain	20	50
Nausea	17	42.5
Vomiting	12	30
Diarrhea	16	40

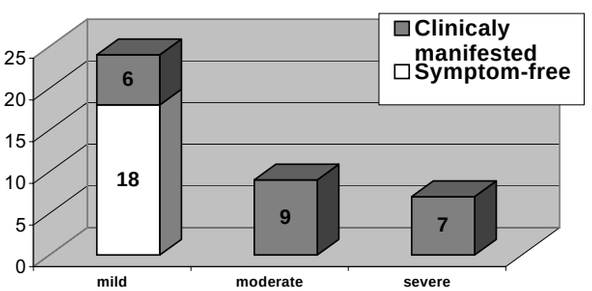

Fig. 2. Clinical forms of salmonellosis.

Twenty-nine (72.5%) patients underwent microbiological analyses of feces initially and 27 (67.5%) patients also had follow up analyses. *S. typhimurium* was not isolated in 11 (27.5%) patients. They all had consumed contaminated minced meat. Three of them had clinical features of the disease. The Salmonella strain isolated from the minced meat and from the affected individuals was identical.

Discussion

Cattle and poultry are the natural reservoir of Salmonellae. Healthy carriers are of great significance[5,7]. In study cases, the clinical course of the disease was predominantly mild and characterized by the usual symptoms[12,13]. There were no fatal outcomes. Therapy with ciprofloxacin proved successful in most patients[4,14]. The short incubation period, the sudden onset and the food involvement defined the disease as food poisoning due to *S. typhimurium*.

It was presumed that the meat of domestic animals could be the source of Salmonella. The owner and his relatives declared they had consumed meat several times before the epidemic outbreak and none of them had any signs and symptoms of disease. Some members of the family that manufactured and sold minced meat might have been healthy carriers and a reservoir of the infection, however, this hypothesis could not be verified. Refrigerator failure within a month created favorable conditions for the bacterial growth and toxin release in minced meat. The isolation of Salmonella and another three pathogens confirmed this supposition. Transmission of the infection was alimentary, as all affected individuals had consumed minced meat, implying the inter-individual route of transmission. Fecal-oral transmission was not proven as a factor of reinfection. There was no case of reinfection.

Poor living conditions and low health education are conductive to enteric infections. The surveillance and treatment of patients is even more complicated for the lack of health insurance.

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Sažetak

EPIDEMIJA ZARAZE *SALMONELLA TYPHIMURIUM* U ROMSKOJ ETNIČKOJ ZAJEDNICI – KLINIČKO EPIDEMIOLOŠKI OSVRT

L. Pekova

Opisuje se epidemija koja je izbila u listopadu 2005. godine u romskoj zajednici, a bila je povezana s uzimanjem kosanog mesa podrijetlom s manjeg gospodarstva bez sanitarnog nadzora. *Salmonella (S.) typhimurium* je potvrđena kao etiološki uzročnik epidemije. Cilj studije bio je ispitati kliničke i epidemiološke nalaze kod ove epidemije. Ispitana je skupina od 40 Roma u dobi od 2 do 77 godina, 15 muških i 25 ženskih osoba. Provedene su kliničke, laboratorijske, mikrobiološke i epidemiološke pretrage. Klinički manifestna malaksalost, groznica i proljev zabilježeni su u 22 (55%) bolesnika. Šestoro bolesnika je imalo blagi oblik, devetoro umjeren oblik, a sedmoro težak oblik salmoneloze, dok je 18 (45%) bilo asimptomatično. Većina bolesnika je imala tipične kliničke manifestacije, pričem je prevladavao umjeren i teži oblik zaraze. Uzimanje namirnica bez sanitarnog nadzora nije neuobičajeno u romskoj zajednici zbog loših uvjeta života i niske razine zdravstvenog obrazovanja.

Ključne riječi: *Bakterijske infekcije – epidemiologija; Otrovanje hranom zaraženom salmonelom – etiologija; Salmonella typhimurium – mikrobiologija; Onečišćenje hrane; Bugarska*