

EPIDEMIOLOGICAL, CLINICAL AND PARACLINICAL ASPECTS IN FOOD TOXIINFECTION

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Abstract

Food toxiinfections (Salmonella, Shigella, Escherichia Coli, Yersinia Enterocolitica, Campylobacter Jejuni) represent a groups of diseases produced by the ingestion of some germs or bacterial toxins (BIRO, 1999), together with the contaminated food, having the same clinical picture (abdominal pains, nausea, vomiting, diarrhoea, fever and dehydration) and appearing at the same time at more guests. The Anglo-Saxon term of the food poisoning represents a wider concept of approaching this pathology, including also chemical food poisoning produced by nonbacterial toxins (REBEDEA, 2000).

The course of the disease is generally short, self-limited once the organism gets rid of the pathogenic agent (CHIOTAN, 1999).

Important differences were recorded in what regarded the origins of the patients, 64 % of cases coming from the rural area This situation is due to the poor conditions of hygiene and sanitary education from this area, to the possibilities of food processing and storage in conditions less than proper.

Keywords: food infection, bacterial toxins, antibiotics

INTRODUCTION

An infectious dose of *Salmonella* is small, probably from 15 to 20 cells. Typically, non-typhoidal *Salmonella* produces a self-limiting febrile gastrointestinal illness that is indistinguishable from that caused by other bacterial enteric pathogens. Dehydration is the principal clinical concern. The incubation period – the time between ingestion of *Salmonella* bacteria and the onset of illness – varies from six to 72 hours (Mayo Clinic, 2007, April 12; MMWR Recomm Rep, 2001).

Salmonella can cause three different kinds of illness: gastroenteritis, typhoid fever, and bacteremia.

Symptoms of *Salmonella* gastroenteritis include diarrhea, abdominal cramps, fever, nausea, and/or vomiting. In mild cases diarrhea may be non-bloody, occur several times per day, and not be very voluminous; in severe cases it may be frequent, bloody and/or mucoid, and of high volume.

Fever generally occurs in the 100°F to 102°F (38°C to 39°C) range. Vomiting is less common than diarrhea. Headaches, myalgias (muscle pain), and arthralgias (joint pain) are often reported as well. Whereas the

diarrhea typically lasts 24 to 72 hours, patients often report fatigue and other nonspecific symptoms lasting 7 days or longer.

Campylobacter jejuni is a gram-negative, microaerophilic, thermophilic rod that grows best at 42°C (107°F) and low oxygen concentrations. These characteristics are adaptations for growth in its normal habitat – the intestines of warm-blooded birds and mammals. Several closely related species with similar characteristics, *C. coli*, *C. fetus*, and *C. upsaliensis*, may also cause disease in man but are responsible for less than one percent of human infections annually (CDC, 2005, October 6).

Food is the most common vehicle for the spread of *Campylobacter*, and chicken is the most common food implicated. Contamination occurs during animal slaughter and processing when it comes into contact with animal feces. Ingestion of as few as 500 organisms – an amount that can be found in one drop of chicken juice – has been proven to cause human illness (FSIS, 1996; Tauxe, 1992). Despite this low infectious dose and the prevalence of *Campylobacter jejuni* in the environment, most cases of *Campylobacter* infection occur as isolated, sporadic events, and are not usually a part of large outbreaks. But, very large outbreaks (>1,000 illnesses) of campylobacteriosis have been documented, most often from consumption of contaminated milk or unchlorinated water supplies.

The bacterial dysentery is a specific human and very contagious disease, caused by the infection with germs from the *Shigella* genus (CHIOTAN, 1998), located in the distal colon, sigmoid and rectum, developing with diarrhoea, abdominal pain, rectal tenesma and occasionally with fever and vomiting (REBEDEA, 2000).

The dysenteric stool is fecalised, in reduced quantity (rectal sputum), with muco-pyo-sanguinolent content. Falling ill is determined by the penetrating invasion of the colon's mucosa, with shigella's negative Gram bacilli from the *Enterobacteriaceae* family.

The infection is endemic and self-limited in the industrialised countries and with a high factor of severity in the tropical countries or countries with a low level of hygiene.

The main serotypes of pathogenic *Shigella* are:

- *Shigella dysenteriae* which included 10 different serotypes. From among these the best known are: *Shigella shigae*, *Shigella schmitzii* and *Shigella Large-Sachs*.
- *Shigella flexneri* with 8 serotypes and 9 antigenic determinants. This is the only group that, besides the type specific antigens, also possessed antigenic group factors.
- *Shigella boydii* which contains 18 serotypes.
- *Shigella sonnei* which has one serotype with several biotypes.

The source of infection are subjects with an acute form of disease, convalescent or healthy *Shigella* carriers. The natural receiver of the *Shigella* is the human alimentary canal, *Shigella* being eliminated through the fecal matters of the infected subjects.

The way of spreading is fecal or oral. Secondary cases appear from direct contact with the excretive individual, or indirect from distance, through contaminated objects, food or water.

The responsiveness is general (BIRÓ, G. 1993, REBEDEA, 2000).

Escherichia coli (*E. coli*) are members of a large group of bacterial germs that inhabit the intestinal tract of humans and other warm blooded animals (mammals, birds). Newborns have a sterile alimentary tract which within two days becomes colonized with *E. coli*.

The best known and most notorious Stx-producing *E. coli* is *E. coli* O157:H7. It is important to remember that most kinds of *E. coli* bacteria do not cause disease in humans, indeed, some are beneficial, and some cause infections other than gastrointestinal infections, such urinary tract infections. This section deals specifically with Stx-producing *E. coli*, including specifically *E. coli* O157:H7.

Although *E. coli* O157:H7 is responsible for the majority of human illnesses attributed to *E. coli*, there are additional Stx-producing *E. coli* (e.g., *E. coli* O121:H19) that can also cause hemorrhagic colitis and post-diarrheal hemolytic uremic syndrome (D+HUS). HUS is a syndrome that is defined by the trilogy of hemolytic anemia (destruction of red blood cells), thrombocytopenia (low platelet count), and acute kidney failure.

Yersinia enterocolitica is a species of gram-negative coccobacillus-shaped bacterium, belonging to the family Enterobacteriaceae. Primarily a zoonotic disease (cattle, deer, pigs, and birds), animals that recover frequently become asymptomatic carriers of the disease (ALONSO PORRAS R et al.,1992)

MATERIAL AND METHODS

The paper presents the results of a study performed on a number of 574 patients, hospitalised in the Clinical Hospital of Infectious Diseases from Oradea, between 1st of January 2008 and 31st December 2008, with the diagnosis of food toxiiinfection.

The aetiological agent was established by the coprobacterial test, which was performed in the hospital lab.

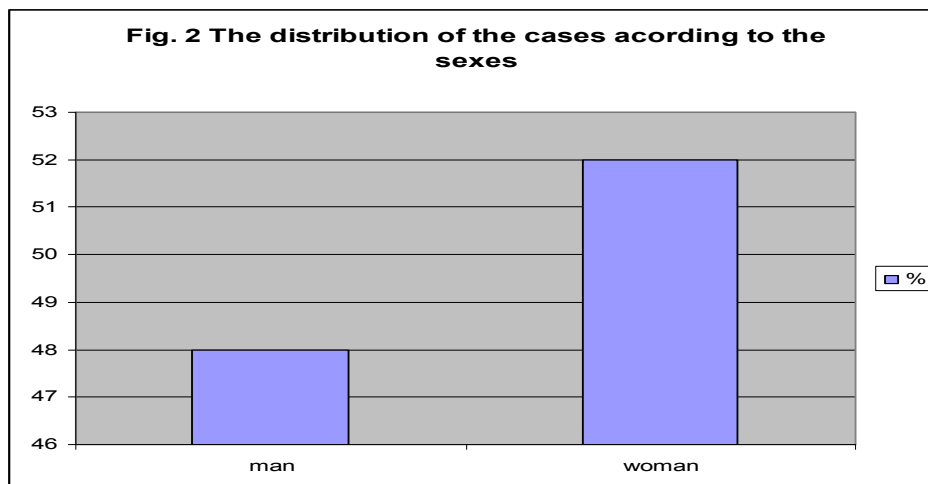
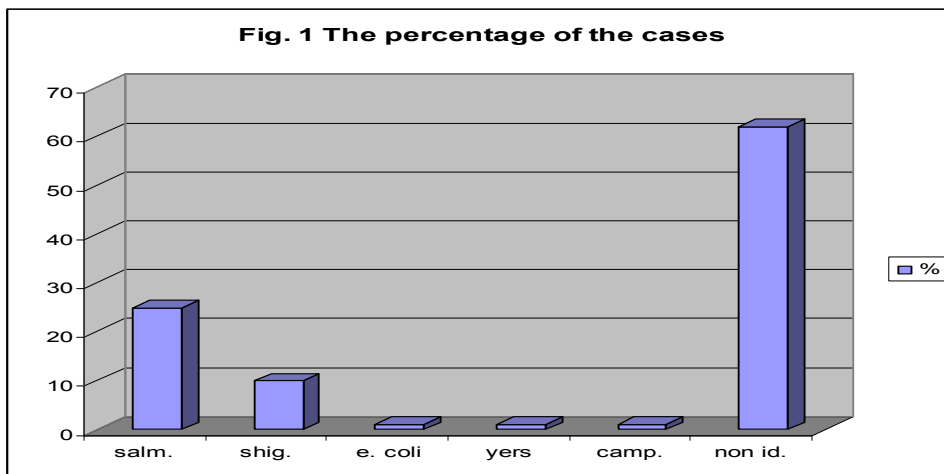
In order to determine the sensitiveness to different antibiotics, the isolation of the pathogenical agents was also performed in the lab.

RESULTS AND DISCUSSIONS

From the analysis of the observation sheets, found in the Hospital's archive, as well as from the direct observations performed during the above-mentioned period of time, it results that the most frequent cases of food toxiifections were caused by the *Salmonella spp.*, *Shigella flexneri* and *sonnei*.

From among these two pathogenical agents, a major presence was registered by the *Salmonella species*, with a percentage of 25% (Figure 1).

There weren't noted important differences regarding the patients sexes, the diseases affecting, in almost equal proportions, both female (48%) and male (52%) individuals (Figure 2.)



The variation of the cases frequency according to the seasons, shows a rise in the number of patients that needed hospitalisation during the summer months (June-July-August) (Tabel no 1.), 65% from the cases, compared to only 35% during winter months. The explanation lies in the difficulty to ensure, during the warmer time of the year, the storage, preparation and consumption of the food products in proper hygienial condition.

From among the 35% of the cases appeared during the winter months, especially in december, most of them were caused by the *Yersinia enterocolitica*, a fact specific in the situations mentioned in the speciality literature

Analysing separately the patients with the diagnosis of intoxication with *Salmonella spp.*, *Yersinia*, *E. coli*, we noted a higher frequency in old people (50%), compared to children (26%) and adults (24%), due to the different biological substance of the patients, the resistance to the disease being influenced by different associated illnesses .

Table 1

The variation of cases frequency according to the season.

Months	Nr of cases
January	54
February	26
March	15
April	84
May	80
June	79
July	101
August	35
September	34
October	40
November	9
December	35

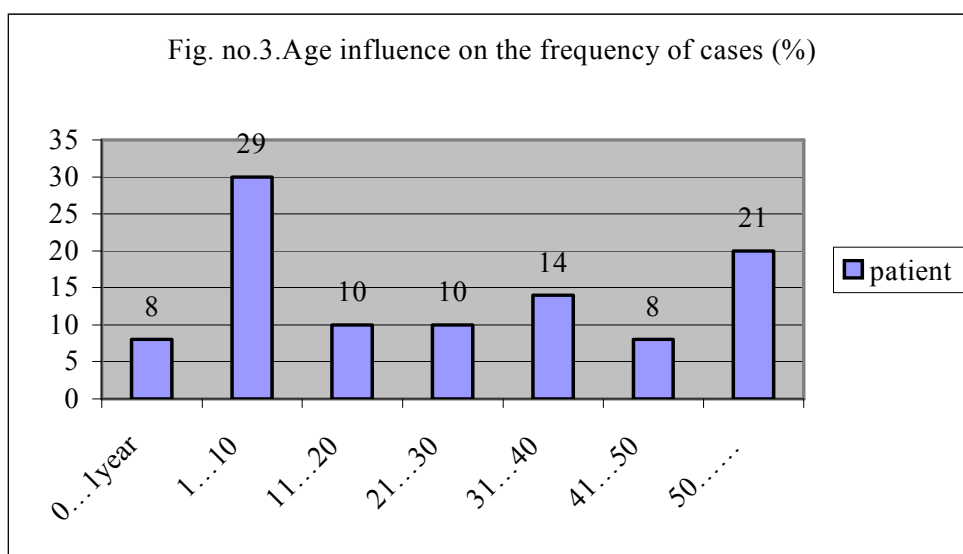
The symptomatology of patients with toxiinfection consists in: fever, shivers, nausea, diffused abdominal gripes, diarrhoea, state of dehidratation. From among the studied cases, the most frequent symptoms was fever together with food vomiting and diarrhoea with mucus, symptoms otherwise specific for the toxiinfection with *Salmonella spp.*

The dysenteric stool is afecalised, in reduced quantity (rectal sputum), with muco-pyo-sanguinolent content. Falling ill is determinated by the penetrating invasion of the colon's mucous, with shigell's negative Gram bacilli from the *Enterobacteriaceae* family.

The infection is endemical an self-limited in the industrialised countries an with a high factor severeness in the tropical countries or countries with a low level of hygiene.

We also observed the course of the symptomatology in the subjects with bacterial toxiiinfection , concluding the following: the evolution is generally up to 7 days, an exception being the subjects with low tolerance to dehydration, in which the course of the symotomatology to the complete recovery is up to 10 days .

Important variations are noted according to the patients' age, the most liable to catch the diseases being children between 1-10 years (29%), as well as adults over 50 years old (21%), this due to the different biological substance of the patients, the resistance to the diseases being influenced by different associated illnesses (Figure no.3.).



The main types of food incriminated as being sources of infection in the studies cases are (Tabel no. 2.):

Table 2

The detected sources of infection

	eggs	cakes	icecream	meat	dairy product
%	27	20	21	12	24

CONCLUSIONS

- The most frequently met aetiological agent in the performed study was *Salmonella spp.*
- The most frequent hospitalizations took place during the summer months (May-June-July-August).
- The most frequently met symptoms, in toxiinfection with *Salmonella spp.*, are fever vomiting and diarrhoea with mucus.
- The complete recovery of the symptomatology is accomplished generally in 5-7 days, an exception being the old patients, to whom the recovery takes about 10 days.
- There weren't noted important differences regarding patients's sexes.
- Food toxiinfections mainly affected children between 1-10 years old, as well as adults over 50 years old.

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