Clinical and epidemiological features of campylobacteriosis in Ukraine

Conducting a large-scale epidemiologic research in Ukraine allowed to define that patients with campylobacteriosis amounted to 1.9% among all tested patients having acute enteric infections. The probable difference in the proportion of campylobacteriosis in children and adults having acute enteric infections has not been confirmed, changing the perception of this infection as «infant». Certain frequency of mixed infection in campylobacteriosis conceals it, which is also strengthened with the lack of bacteriodiagnosis of this clinical entity of acute enteric infections in practical healthcare institutions.

Key words: campylobacteriosis, epidemic process, risk groups, risk season, bacteria carrying, mixed infection.

Preamble
Among acute intestinal infections (AII) of unknown aetiology, a significant proportion belongs to campylobacteriosis, etiological agents of which are Campylobacter bacteria. Today this intestinal infection is registered in many countries at all continents (Blaser M.J., 1997). By the early 1990s, at the global mapping system of campylobacteriosis Ukraine was a "white spot" (Kryyk and D.L., et al., 1991). Epidemiologic features of campylobacteriosis, as well as of other infectious diseases, are subject to change. Without the study of these evolutionary changes based on the analysis of dynamics of campylobacteriosis epidemiological features and its biological factors in specific regional conditions, we cannot provide for effective therapeutic, prophylactic and preventive measures with the least economic cost (Coker A.O. et al., 2002).

The purpose of this study is to identify the main clinical and epidemiological features of campylobacteriosis infection in Ukraine.

Object and methods of research
We have made a bacteriological study - to identify Campylobacter bacteria – of material from 26 707 patients with AII, including 18 786 children. In order to find out asymptomatic carriers among different groups, we carried out a bacteriological study of 979 healthy individuals. We also executed epidemiological studies of 216 campylobacteriosis sources and analyzed 384 patient records with campylobacteriosis. Material for bacteriological research from patients with AII and from healthy individuals (excrement) was placed in a medium for sterility control (pH 10), which was used as a transport one. Ratio of the investigated material to the medium was 1:5. For separating campylobacteria we effected seeding of 0.1 ml of the material suspension in the transport medium for two cups of iron-erytryt-blood agar (IEBA) with aerotolerant additives and antibacterial supplement (Cherkassky B.L. et al., 1989). Crops were incubated at 42 °C in microaerophilic conditions created in microaerophilic machine using gas-generating packages "Campilogaz" (SRI "Synthesis", Ukraine). Cultivation lasted for 48 hours with an overview of cups every 24 hours. Identification of campylobacteria separated was performed using the following tests: Gram staining patterns, mobility in a dark box, oxidase and catalase production, hypurate hydrolysis, sensitivity to nalidix acid, ability to grow on Russell medium at 37 °C under aerobic conditions. We have carried out immuno-diagnostics with paired sueros of 183 patients with campylobacteriosis by ultrasound campylobacteriosis antigen in the indirect hemagglutination reaction (Penner J.L., Hennessy J.N., 1980).

Results and Discussion
Based on the clinical and epidemiological data, confirmed by bacteriological separation of bacilo, in 519 of 26,707 patients examined for AII, we diagnosed campylobacteriosis (1.9%). Campylobacteria were identified in 440 (2.3%) of 18,786 children-patients with AII and in 79 (1%) of 7,921 adult-patients with AII (Table 1). Share of campylobacteriosis in the structure of AII of investigated regions of Ukraine was: in Dnipropetrovsk - 1.6%, Zaporozhye - 3.4%, Kyiv - 2.7%, in Chernaky - 2.1%. Among the children population, share of campylobacteriosis in the structure of all investigated regions was 2.1, 3.4, 2.9 and 1.1%, respectively. Differences in the data are more likely related to the peculiarities of campylobacteriosis bacteriological diagnosis methods in these cities (medium, creating microaerophilic conditions, etc.) and heterogeneous type of patients examined, rather than to social and geographical differences. For objective assessment of the share of campylobacteriosis in the AII structure and age distribution of patients with campylobacteriosis among persons with AII, we have carried out relevant research in Kyiv and Zaporizhia acc. to the unified methodological basis. Clinical and epidemiological data have been confirmed by bacteriological separation of bacilo, by immunodiagnostic method using campylobacteriosis erythrocyte diagnosticum and effectiveness of chemotherapy carried out. Proportion of cases ranged from 2.3% in the group of adults aged > 40 years to 4.2% - in the group of children aged 3-4 years. In children under 1 year the rate was 2.6%.

In general, the proportion of campylobacteriosis in the structure of AII in the studied regions was 1.9%. We have not found significant difference in the incidence of children and adults (see Table 1). Proportion of patients of these groups was 2.3 and 1.9% (p>0.05), respectively. Other authors found the prevalence of campylobacteriosis in children (Tenkate T.D., Stafford R.J., 2001).

Objectivity of diagnosis in patients with campylobacteriosis was confirmed by immunodiagnostic using bacterial erythrocyte diagnosticum. The level of immunodiagnostic confirmation campylobacteriosis incidence ranged from 88.5% in patients under the age of 1 year to 95.0% - in the group of children aged 3-19 years old. Overall sensitive of immunodiagnostic method in patients with campylobacteriosis reached 90.7%, which fully satisfied the requirements for erythrocyte campylobacteriosis diagnosticum.

Table 1. Results of bacteriological examination for campylobacteriosis among patients with AII in different cities of Ukraine

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Cities</th>
<th>Dnipropetrovsk’k</th>
<th>Zaporizhia</th>
<th>Kyiv</th>
<th>Chernaky</th>
<th>Totally</th>
</tr>
</thead>
<tbody>
<tr>
<td>All examined patients with AII</td>
<td>17566</td>
<td>3465</td>
<td>3616</td>
<td>2060</td>
<td>26707</td>
<td></td>
</tr>
<tr>
<td>including children</td>
<td>12438</td>
<td>2644</td>
<td>2480</td>
<td>1224</td>
<td>18786</td>
<td></td>
</tr>
<tr>
<td>All patients with diagnosed</td>
<td>275</td>
<td>118</td>
<td>98</td>
<td>44</td>
<td>519</td>
<td></td>
</tr>
<tr>
<td>campylobacteriosis, n (± m)</td>
<td>(1.6 ± 0.1)</td>
<td>(3.4 ± 0.3)</td>
<td>(2.7 ± 0.3)</td>
<td>(2.1 ± 0.3)</td>
<td>(1.9 ± 0.1)</td>
<td></td>
</tr>
<tr>
<td>including children, n (± m)</td>
<td>264</td>
<td>73</td>
<td>12</td>
<td>113</td>
<td>440</td>
<td></td>
</tr>
<tr>
<td>(2.1 ± 0.1)</td>
<td>(3.4 ± 0.4)</td>
<td>(2.9 ± 0.3)</td>
<td>(1.1 ± 0.1)</td>
<td>(2.3 ± 0.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When analyzing the incidence of various social and age groups, we have noted that disorganized children made 44.0% of all diseased. The second place by the incidence was taken by children attending kindergartens - 22.2%, and the third – by unemployed adults and seniors (13.9%). The smallest social groups at risk of campylobacteriosis were students and employees (0.9 and 1.4% of the total of cases, respectively) (Table 2).

The need for effective primary preventive measures in the places of campylobacteriosis makes it necessary to effect analysis of clinical manifestations of campylobacteriosis in adults and children. Duration of the incubation period in adults and children usually made 1-2 days. Clinical campylobacteriosis in 70% of children below 1 year was characterized by acute onset. In 82% of children aged > 1 year and 74.6% of adults same onset was registered. The leading clinical manifestations of campylobacteriosis in all age groups were dyspepsia and general signs of intoxication.

In children and adults we did not observed light disease course. Proportion of patients with a severe course of campylobacteriosis declined with age and was among children aged <1 year - 38.0%; aged > 1 year - 18.7%; among adults - 14.4%. In infants we more often registered afebrile course of the disease (35.7%). Liquid excrements with pathological impurities were observed in 87.5% of children aged > 1 year, in 93.3% of children aged <1 year and in 82.1% of adults, including with blood - 4.3-25%. The frequency of excrements 6-9 times per day was observed in 56.7% of children aged <1 year, 43.7% of children aged > 1 year and in 32.1% of adults. Duration of diarrheal syndrome in both children and adults made up to 14 days. Recovery came in 7-14 days, sometimes in 2-3 weeks we noted recurrence of the disease. So clinical picture of campylobacteriosis has no clear pathognomonic symptoms, it’s main symptoms are fever, frequent liquid stools (with admixtures of blood), abdominal pain (Vorotintseva N.V. Gorelov A.V., 2001).

### Table 2. Incidence of campylobacteriosis in people of different social and age groups

<table>
<thead>
<tr>
<th>Group of people</th>
<th>Number of patients, n (% ± m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fugitive children</td>
<td>95 (44.0 ± 3.4)</td>
</tr>
<tr>
<td>Children in kindergartens</td>
<td>48 (22.2 ± 2.9)</td>
</tr>
<tr>
<td>School students</td>
<td>26 (12.0 ± 2.2)</td>
</tr>
<tr>
<td>Students</td>
<td>2 (0.9 ± 0.6)</td>
</tr>
<tr>
<td>Employees of trade and catering</td>
<td>5 (2.3 ± 1.0)</td>
</tr>
<tr>
<td>Office employees</td>
<td>3 (1.4 ± 0.8)</td>
</tr>
<tr>
<td>Workers</td>
<td>7 (3.2 ± 1.2)</td>
</tr>
<tr>
<td>Non-working and retirees</td>
<td>30 (13.9 ± 1.2)</td>
</tr>
<tr>
<td>Total</td>
<td>216 (100)</td>
</tr>
</tbody>
</table>

Seasonality is typical for campylobacteriosis. Seasonal increase in campylobacteriosis occurs in spring and summer (April - August) and in October. Of the total number of detected patients, 71.5% were those who fell ill during the seasonal rise.

In addition, the effect of seasonal factors of intensifying campylobacteriosis epidemic process was observed in Chernkassy in December and in Dnepropetrovsk in November. This is due to catch from infected during the seasonal increase (summer period), as well as from ill persons. We understand the epidemiological patterns of campylobacteriosis infection, we need to complete maximum identification and consideration of not only patients, but also infected persons. This made relevant the research of campylobacteriosis infection among different population groups.

The frequency of asymptomatic carriers ranged from 0.8% in healthy children to 16.4% in patients who underwent campylobacteriosis (campylobacteriosis bacteria can survive up to 1 month). Those who contacted sick people and animals in campylobacteriosis focus, were infected with these pathogens in 13.4 and 11.4% of cases, respectively, and workers at meat and poultry processing plants - in 3.7% cases.

Absence of reports of campylobacteriosis outbreaks is impossible to recognize as an objective indicator. Such outbreaks are not identified because with campylobacteriosis, as with most of AII, often bacteria associations are becoming pathogens (Lastovica A.J. et al., 1986). The latter mask the incidence of campylobacteriosis, due to the lack of mass laboratory tests to identify this pathogen in practical health care institutions of Ukraine.

Thus, reported as sporadic cases of campylobacteriosis largely reflect outbreaks that periodically occur and remain undetected. The reason for this is primarily campylobacteriosis bacteria-infected food, sold through distribution networks or catering.

When analyzing the frequency and nature of microbial associations, we discovered in campylobacteriosis patients that in 19 (8.8%) of 216 cases, together with campylobacteriosis bacteria, we found _Salmonella_ bacteria (_S. enteritidis, S. typhimurium_). Perhaps these pathogens act simultaneously. The case of infection of a father and a child through raw eggs is illustrative. Both, after the incubation period (14 h), with a diagnosis of "acute enterocolitis" were brought to infectious hospital. In this case, in the girl’s excrements _C. jejuni_ was found, and in her father’s excrements - _S. enteritidis_. Both showed a diagnostic increase of corresponding antibodies levels. Pathogens of dysentery and colibacillosis were found in 4.2 and 3.7% of campylobacteriosis cases, respectively, and opportunistic bacteria - in 5.1% of all analyzed cases of campylobacteriosis.

### Conclusions

1. The large-scale epidemiological studies in Ukraine revealed that patients with campylobacteriosis make 1.9% of all examined patients with AII.
2. The difference in share of campylobacteriosis in the structure of intestinal infections in selected areas is primarily related to the quality level of bacteriological diagnosis of this infection in local health care facilities.
3. There was no significant difference in share of campylobacteriosis in children and adult patients with AII, which changes the picture of this infection which was considered primarily as children’s.
4. The risk group for campylobacteriosis includes almost all age groups, but first of all: children aged <7 years, persons with weakened resistance (sonatic diseases of the gastrointestinal tract, diseases of the cardiovascular system, etc.), as well as employees whose professional activity is related to the care of animals, birds and their processing.
5. Certain frequency of mixed infection with campylobacteriosis is masking it, which is also reinforced by the lack of bacteriological diagnosis of this nosology form of AII by practical health care institutions.

### Literature


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