EPIDEMIOLOGICAL EVENTS IN THE POSTENTERITIS SYNDROME IN CHILDREN

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Abstract

The postenteritic syndrome or persistent postenteritic diarrhoea is a disease with chronic evolution (over 2-3 weeks), occurring immediately after an acute gastroenteritis, requiring, in most cases, hospitalization. The exact pathogenesis of postenteritic persistent diarrhoea is not precisely known, several factors being probably involved. The main etiopathogenic links intervening in the manifestation of the postenteritic syndrome in children are the intestinal pathogenic germs, the occurrence and persistency of intestinal mucous lesions and the functional insufficiency of the small intestine, besides other favourizing factors that may be involved. The study was carried out on a group of 149 children, with ages between 1-29 months, hospitalized, between Oct. 2005-Dec. 2009, in the Section of Gastroenterology at “St. Maria” Clinical Hospital for Children of Iași.

Keywords: acute diarrhoea, postenteritic syndrome, small intestine

INTRODUCTION

The postenteritic syndrome is one of the most common causes of morbidity and mortality in children in the world. Even if the frequency and severity of this malady is closely related to poverty, it also appears in the economically-developed countries. It is estimated that about 5 million children affected by it die each year.

The clinical picture of this disease is a polymorphous one, sometimes suggestive for bacterial gastroenterites, even if, in most cases they cannot be etiologically classified, as having a self-limited evolution, around 5 and 15% of the variable cases showing prolonged evolution.

THE AIM OF THE STUDY

The child suffering from the persistent diarrhoea syndrome, characterized by periods of acalmy alternating with critical ones, enters a vicious circle: chronic diarrhoea – malabsorption – malnutrition. The persistency of the gastroenteritic phenomena is related to the lesions of the intestinal mucous membrane, which generate secondary digestive disorders. On the other side, disorders of intestinal motility may occur, or bacterial pollution through multiplication of some potentially or optionally pathogenic bacteria, as well as a reduced pancreatic secretion or immunological disorders that may activate the local immunitary system. The evolution of the disease may evidence clinical signs of insufficiency to the protein from cow milk (IPLV or APLV) or intestinal malabsorption (1). Such evolutions are related to the penetration, through the injured intestinal mucous membrane, of some non-hemolyzed or partially-hydrolyzed alimentary proteins. Protein-caloric malnutrition is constantly associated, inducing vitamin, oligoelements, essential fatty acids deficiency. The frequently associated infectious episodes increase the nutritional deficit and aggravate the histological and functional modifications of the intestine. Frequently, the postenteritic syndromes may be the starting point of intestinal malabsorptions, especially the celiac one, in the same way in which the APLV specific manifestations represents, in numerous cases, the debut of celiakie. Intestinal inflamma-
tory infections usually have one or several postenteritic episodes during their evolution.

MATERIALS AND METHOD

A retrospective study was carried out on a group of 149 children, with ages between 1-29 months, hospitalized, between Oct. 2005-Dec. 2009, in the Section of Gastroenterology at “St. Maria” Clinical Hospital for Children of Iași.

The children considered in the study had been selected from a total number of 7379 subjects diagnosed and treated in the Pediatry – Gastroenterology Clinics of ”St. Maria” Clinical Hospital for Children of Iași.

The observation sheets offered valuable information on the:

- Age and sex of the patient
- Residence area: rural or urban
- Diagnosis at hospitalization and externation
- Symptomatology
- Paraclinical investigations

Clinical examination had in view the stature-weight development of the patients, the aspect of teguments, some hemodynamic parameters (TA, pulse, diuresis, clinical examination of the digestive apparatus), data being recorded on appetite, intestinal tract, etc.

From the viewpoint of the paraclinical tests, the patients were subjected to an investigation protocol including:

- Determination of height and weight
- Standard examinations: hemoleukogramme with the leukocitary formula, number of thrombocytes
- Determination of the erythrocity indices, of seric reticulocyte syderemy
- Renal tests – blood urea acido-basic and hydro-electrolytical balance
- Hepatic tests
- coproparasitological examinations
- Digestive endoscopy

Statistical processing of data, performed in SPSS 16, included specific parametric and non-parametric tests, the evaluation of results making use of descriptive statistical indices. Statistical evaluations were characterized by a 95% confidence interval (2).

OBJECTIVES

The study aims at evidencing the epidemiological events of the postenteritic syndrome in children, starting from the assertion, supported by ample investigations, according to which a large number of cases viewed as postenteritic syndroms are actually food allergies or food intolerances or, quite certainly, malabsorptions syndromes still untraced clinically and biologically, or manifestations of celiac debut (3, 4).

RESULTS

Between October 2005 – December 2009, the diagnosis of postenteritic syndrome registered in the Clinics had a prevalence of 7.16% (tab. 1, fig. 1).

Table 1

<table>
<thead>
<tr>
<th>Vth Clinics of Pediatry (Gastroenterology)</th>
<th>No. Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other maladies</td>
<td>95746</td>
<td>92.84%</td>
</tr>
<tr>
<td>Postenteritic syndrome</td>
<td>7379</td>
<td>7.16%</td>
</tr>
<tr>
<td>Total</td>
<td>103125</td>
<td></td>
</tr>
</tbody>
</table>

A significant reduction in the number of cases of postenteritic syndrome in children may be
noticed ($\chi^2=120.56$, $p<0.05$, 95%CI), the value recorded in December 2009 being of 6.39% while, in October 2005, the frequency recorded was of 10.26%, as demonstrated by the results of the Chi-square test (table 2, fig. 2). The possible explanation includes an early visit to the doctor and the improvement of the socio-economic conditions.

Table 2. Annual evolution of the number of cases

<table>
<thead>
<tr>
<th>Year of study</th>
<th>Total No. cases</th>
<th>Postenteritic syndrome No. Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct. 2005</td>
<td>4844</td>
<td>497</td>
<td>10.26%</td>
</tr>
<tr>
<td>2006</td>
<td>18528</td>
<td>1650</td>
<td>8.91%</td>
</tr>
<tr>
<td>2007</td>
<td>19873</td>
<td>1460</td>
<td>7.35%</td>
</tr>
<tr>
<td>2008</td>
<td>27321</td>
<td>1691</td>
<td>6.19%</td>
</tr>
<tr>
<td>Dec. 2009</td>
<td>32559</td>
<td>2081</td>
<td>6.39%</td>
</tr>
<tr>
<td>Total</td>
<td>103125</td>
<td>7379</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 2. Annual evolution of number of cases

Distribution of cases according to the sex of patients demonstrated a slightly higher frequency in males – 59.73% – comparatively with the frequency values recorded in women – 40.27%. Distribution of cases according to the age of children appears as a normal one, the highest values occurring in babies with ages below 5 months (41.6%) and also in the 5-10 month-old ones (34.2%). A lower frequency was registered for cases with ages over 15 months (8.05%) (table 3).

The average age in the experimental group shows no significant differences as a function of sex, as indicated by both statistics F ($F=0.130$) and significance level of the test ($p=0.718$, 95%CI), the values being of 7.5 months±4.09SD for female patients and of 7.8 months±6.9SD, for males. The minimum value of age was of 1 month and the maximum one – of 29 months (fig. 3).

Table 3. Distribution of cases as a function of the age of patients from the experimental group

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>No. cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0&lt;age&lt;=5</td>
<td>62</td>
<td>41.61%</td>
</tr>
<tr>
<td>5&lt;age&lt;=10</td>
<td>51</td>
<td>34.23%</td>
</tr>
<tr>
<td>10&lt;age&lt;=15</td>
<td>24</td>
<td>16.11%</td>
</tr>
<tr>
<td>15&lt;age&lt;=20</td>
<td>3</td>
<td>2.01%</td>
</tr>
<tr>
<td>20&lt;age&lt;=25</td>
<td>6</td>
<td>4.03%</td>
</tr>
<tr>
<td>25&lt;age&lt;=30</td>
<td>3</td>
<td>2.01%</td>
</tr>
<tr>
<td>Total</td>
<td>149</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 3. Statistical indices of age as a function of sex at the beginning of the study

The frequency is seen as higher in the urban cases (52.35%), versus the rural value of 47.65%.

The weight of the children making up the experimental group recorded minimum values of 2.1 Kg and maximum ones of 14 Kg, with a mean value of 6.93 Kg±2.2SD. The weight of the children suffering from the postenteritic syndrome was significantly lower ($F=9.5$, $p=0.023$, 95%CI) than in the reference group, which
included children not affected by digestive maladies (tab. 4, fig. 4).

### Table 4. Statistical indices of children weight at the beginning of the study

<table>
<thead>
<tr>
<th>Reference</th>
<th>Mean weight</th>
<th>Mean weight -95%</th>
<th>Std. Dev.</th>
<th>Std. Err.</th>
<th>Min</th>
<th>Max</th>
<th>Q25</th>
<th>Median</th>
<th>Q75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>8.17</td>
<td>7.51</td>
<td>8.83</td>
<td>2.01</td>
<td>0.33</td>
<td>5.20</td>
<td>13.00</td>
<td>6.40</td>
<td>8.00</td>
</tr>
<tr>
<td>Study</td>
<td>6.93</td>
<td>6.57</td>
<td>7.29</td>
<td>2.24</td>
<td>0.18</td>
<td>2.10</td>
<td>14.00</td>
<td>5.80</td>
<td>7.00</td>
</tr>
<tr>
<td>Total</td>
<td>7.18</td>
<td>6.86</td>
<td>7.31</td>
<td>2.24</td>
<td>0.16</td>
<td>2.10</td>
<td>14.00</td>
<td>5.90</td>
<td>7.00</td>
</tr>
</tbody>
</table>

**Fig. 4. Statistical indicators of children’s weight in study groups at baseline**

**DISCUSSION**

The postenteritic syndrome represents an evolutive condition occurring in 10% of the cases of acute infectious diarrhoea. The multiple etiological factors, as well as the various histological alterations, create clinico-evolutive images quite difficult to investigate and manage.

The initial acute diarrhoeic episode produces lesions at the level of the intestinal mucous membrane, disappearing within 5-7 days, while the gastroenteritic manifestations continue for more than 2-3 weeks. Motility disorders, deficitary absorption drastically affect growth and install malnutrition.

Considered comparatively with the number of outpatient children between October 2005 – December 2009, the experimental group represents 7.6%. Analysis of the anamnestic and clinical aspects is focused on episodes related to the type of alimentation, diversification of alimentation and modifications induced by the introduction of pastes, vegetable and fruit, and of cow milk. Evolution of ponderal growth was also followed.

The results obtained on weight and stature confirm the implications of absorption disorders, namely slowing down of weight increase, up to complete stopping of growth. Stature deficit is an irrefutable proof of some grave nutritional disorders which, on long-term evolution and in the absence of an adequate therapy and diet, may induce classical visceral dwarfism (5).

Intempestive treatments with antibiotics and chemotherapeutical drugs frequently attenuate the symptoms of the diarrhoeic disease, nevertheless affecting the bacterial intestinal ecosystem. The intestinal gastroenterites show a moderate clinical picture in their acute phase, even if returning to a normal initial alimentation is quite difficult (6).

Coprocultures were negative in 86 of cases (57.2%) and positive in 63 cases (42.8%).

Study of the gastro-oesophagian reflux through barium transit and oesophagian pHmetry demonstrated the presence of gastric folding in 9 cases (6.4%), and gastro-oesophagian reflux in 42 cases (28.9%). Oesophagian pHmetry confirmed the presence of gastrooesophagian reflux in 15 cases (18.5%).

The disagreement between the results obtained by esogastroduodenal transit and pHmetry confirms an aspect presented in numerous studies, namely that the esogastroduodenal transit provides false-positive and false-negative results in 30% of cases (7).

Oesophagian pHmetry is viewed as the „Gold Standar Test” in the diagnosis of gastrooesophagian reflux and control of therapeutical efficiency.

The coproparasitological exam is positive for Giardia in 59 cases (39.0%).

The test of digestion in the stool frequently evidences intracellular starch in 9 cases (6.4%), rarely extracellular starch – 3 cases and rarely intracellular starch in other 3 cases (2.1%). The test for occult hemorrhages is positive in 3 cases (2.1%).
The observation was made that, when leaving the hospital, in most of the cases, the patients had 2 or 3 pathological associations, more frequent being:

- Deficiency Fe anemia – 48 cases (32.1%)
- diarrhoea with *Champylobacter* – 48 cases (32.1%)
- persistent diarrhoea - 45 cases (30.0%)
- gastro-oesphagian reflux – 36 cases (24.6%)
- hypogammaglobulinemia – 33 cases (22.5%)
- Ist degree proteincaloric malnutrition – 30 cases (20.3%)
- APLV – 29 cases (19.6%)
- proteincalorical malnutrition induced by prematurity – 9 cases (6.4%)
- malabsorption syndrome – 9 cases (6.4%)

The postenteritic syndrome occurs as a persistent form of diarrhoea, quite frequently met in pediatric practice, as well as in gastroenterology, with a still incompletely elucidated etiopathogeny, and with a multifactorial component. An important part is played by bacterial, viral, and parasitary infectious agents, with a quasi-constant presence of lesions at the level of the intestinal mucous membrane, all favouring functional intestinal insufficiency. Numerous studies have demonstrated that several cases diagnosed as postenteritic syndromes are actually allergies or intolerances (e.g., IPLV), which may cause celiakie (1,8).

Quite frequently, the postenteritic syndrome represents the preliminary stage or the debut of the malabsorption syndrome, at present insufficiently known from a clinical, formative and biological point of view. The repetitive aspect, the co-existence of refractory anemia to specific therapy and the failure of growth require minute investigations for tracing some of the „silent” forms of celiac disease.

**CONCLUSIONS**

The incidence of postenteritic diarrhoea is diversified, if considering the geographical area and socio-economic level of the country under analysis, as well as the idea according to which this syndrome is diagnosed as a prolonged diarrhoea. It occurs mainly in the developing countries, where pre-existent malnutrition and the enteropathies may cause prolonged diarrhoea in 8-20% of the cases of acute diarrhoea. In the developed countries, the postenteritic syndrome – the causes of which are also nonelucidated – occurs in 5% of cases. Several cases, regarded as postenteritic syndromes, are actually food allergies or intolerances and, obviously, still clinically and biologically not solved malabsorption syndromes. The repeating character of such enteritic diseases necessarily imposes the initiation of investigations for tracing the „silent” celiakie forms.

The postenteritic syndrome includes some cases of acute diarrhoea, with multifunctional etiology, and an evolution longer than 2-3 weeks.

The interference of some pathogenic, bacterial, viral and parasitary agents and the coexistence of some histopathological lesions at the level of the small intestine mucous membrane appear as decisive elements.

The disease represents a pathology frequently met in the daily practice of a paediatrician and gastroenterologist – for example, 7.6% of all hospitalized children were affected by this disease.

Failure of weight growth and, in some situations, gastroenteritic manifestations with prolonged evolution, and also deficiency Fe anemia appear as specific signs.

The postenteritic syndrome has a heterogeneous character, which is related to its multifactorial genesis, involvement of bacterial, viral, and parasitary agents and coexistence or production of histological lesions.

The clinical picture is atypical, including slight or moderate manifestations of gastroenteritis, or functional insufficiency of the small intestine.

Along its evolution, the disease provides clinical, biological and histological pictures specific to cystic pancreas fibrosis, celiac disease, IPLV, exsudative enteropathy, eosinophilic enteropathy etc.

The permanent improvement of the existing laboratory techniques, a long experience and a skillful diagnosis endoscopy, including duodenal biopsies, will lead to a correct diagnosis of the various pathological entities appearing at first sight as postenteritic syndromes.
References


