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Medical Sciences

ACUTE DIARRHEA WITH ROTAVIRUS IN CHILDREN

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ABSTRACT:
ROTAVIRUS DIARRHEA IS A REALITY PRESENT IN PEDIATRIC CASES, OF THE HIGHEST ACTUALITY. THE MORE SEVERE EVOLUTION OF THE DISEASE IN INFANTS MAKES THIS AGE GROUP VERY VULNERABLE TO EVENTUAL HOSPITALIZATION.
INCREASING INFORMATION AND INCREASING ADHERENCE TO VACCINATION IS THE SOLUTION TO REDUCING OR ELIMINATING DISEASE-CAUSING DEATHS.

KEY WORDS: BABY, DIARRHEA, ROTAVIRUS

Rotavirus infection is the most common cause of severe acute diarheea AD in infants and young children. In previous years, there have been reported worldwide 27,000-60000 child deaths to 125 million infected children. The introduction of vaccination, currently in the alternative scheme, not included in the National Mandatory Vaccination Program,

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significantly reduced the morbidity and mortality of the disease[7]. There is no longer so strict the fact that the diarrhea with rotavirus is important during the cold season[8].

Etiologically, the agent discovered in 1973 in the stool and duodenal biopsy of children with diarrhea is an RNA virus of the Reoviride family, with 11 double-stranded segments.

The preferred place of confinement is at the level of the intestinal villi, whre they invade and destroy the vilii, then affecting both the digestion and the absorption process. This is the explanation for the installation of secondary lactose intolerance, usually self-limited for a period of 1-2 weeks.

The younger the child, the higher the severity of the infection (between 3 months and 2 years)[9].

In infants, there is an increased likelihood of complications of AD with acute dehydration syndrome ADS due to rapid short-term hydroelectrolytic losses, relative to the total increased water content of the immature organism and body surface area. The apparition to diarrhea of vomiting, fever will accelerate the rate of loss of H_2O and electrolytes and thus the severity of the disease[10].

Under 3 months the infants are protected by the transplacental antibodies transmitted and by the natural nutrition (the secretory piece "j" produced in the mammary gland connects 2 secretory IgA molecules with protective role, barrier in the digestive and respiratory mucous membranes).

Clinically the disease is manifested by: vomiting that occurs before diarrhea with 12-24 hours, fever, liquid diarrhea, colicative abdominal pain. Symptoms appear after an incubation period of up to 2 days after infection.

Infants and young children (under 2 years of age) may have febrile or seizure-related fever, associate with lethargy, torpor. The impossibility of oral rehydration at these ages will indicate hospitalization for the therapy administered iv.

Immunity after infection is durable for one serotype, the disease may occur for others, being known 7 types of rotavirus (A-G), based on the antigenic properties of VP6 protein. Groups A, B, C cause the disease in humansand the group A with serotypes G1-G4 and G9 are of the greatest clinical importance.

According to the WHO, around 2.4-2.5 million hospitalizations and over 500,000 deaths/year are reported worldwide in children under 5 years.

Diarrhea stools are frequent, liquid, explosive, acidic, with a discolored appearance, usually with a variable number of 8-20 stools/day. There are children with diarrhea of holeriform aspect with more than 30-40 stools/day, sometimes accompanied by bloody streaks, important erythema, even slightly rectal prolapse. There are also extradigestive signs: rhinorrhea, cough (in 20-50% of cases), otitis media (20%) or even rare cases have been reported: encephalitis, aseptic meningitis, pneumonia, myositis, polio-like paralysis,

[7] Tate JE, Burton AH, Boschi-Pinto C, Parashar UD; World Health Organization–Coordinated Global Rotavirus Surveillance Network. Global, regional, and national estimates of rotavirus mortality in children <5 years of age, 2000–2013. Clin Infect Dis. 2016;62 Suppl 2:S96–105. doi: 10.1093/cid/civ1013

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[10] Offit PA, Clark MF. Reoviruses. In: Mandell GL, Bennett JE, Dolin R., editors. Principles and Practice of Infectious Diseases. 5th. Philadelphia, Pa, USA: Churchill Livingstone; 2000: 1696–1703.Farthing M, Linberg G, Dite P, Khalif I, Lindo ES, Ramakrishna BS, et al. Acute diarrhea. WGO practice guidelines; 2008. p. 1-28

hemophagocytic lymphohistiocytosis, hepatitis (in the immunodeficient child). In the severe forms of the disease the existence of viremia has been demonstrated.

Immediate complications of the disease, which indicate, in fact, and hospitalization are: dehydration, hydroelectrolytic disorders, metabolic acidosis, nutritional deficiency.

In rare cases, severe, life-threatening complications may occur: intestinal occlusion, gastric rupture, central pontine myelosis.

The death can occur both due to the complications that have arisen and due to the patient's pre-existing terrain (for example, immunocompromised with increased chances of sudden evolution and death).

The paraclinical diagnostic test, which accurately establishes the disease, is an antigen test, found in the faeces of the patients. Laboratory diagnostic kits based on agglutination latex or enzyme-like immnoabsorbent assays are used.

They are fast, reliable, with sensitivity and specificity 90%.

Blood tests (CBC test, serum ionogram), show hemoconcentration, hydroelectrolytic changes associated with ADS.

TREATMENT

The etiological diagnosis is important for the adoption of relevant therapeutic behavior. Viral infection contraindicates antibiotic therapy.

Hydration of the patient (oral or IV in severe forms), correction of hydrolytic electrolyte disorders (of hyponatremia, hypocalcemia, hypernatriemia with convulsive potential) and correction of hypoglycemia are indicated. In case of metabolic acidosis, ORS with bicarbonate or citrate is supplemented (where possible). In severe forms iv molar solution of bicarbonate is administered. Oral hydration depends on many factors: age of the patient, oral tolerability, severity of the disease, individual association of symptoms (ex vomiting + diarrhea + fever). In infants it can be achieved with difficulty. As a general indication, in infants and young children, in children who do not have vomiting and ADS, it is recommended to continue the age-appropriate diet. Breastfeeding will not be discontinued and, in the case of those with frequent liquid stools and artificial feeding, delactose formulas are recommended, knowing the predilection of viral cantonation at the intestinal brush border, affecting lactase (an enzyme that aids lactose digestion)[11]. Antidiarrheal cereals (rice), dietary preparations (carrots, redcurrants) are indicated. In order to prevent ADS in patients at high risk, the diet will be supplemented with oral rehydration solutions in the form of standardized preparations (Hipp ORS 200, Sun-lyte, Adrehyl etc) in amounts of 2 ml/kg for any stool emitted. In the first 4 hours, 50-100ml/kg of rehydration solutions are usually administered and, if the child's condition improves, the previous diet can be used.

Children with severe ADS (5%) cannot receive oral rehydration solutions due to incoercible vomiting, ileus, abdominal meteorism, lethargy, and is recommended hospitalization and IV administration of medication[12].

The stepping of the therapeutic gestures is the following:

- establishing the venous approach (even epicranial need)
- combating metabolic acidosis with 8.3% $NaHCO_3$ molar solution according to the ionogram or empirically 1-2 mEq / kg dissolved 1/2-1/3 in glucose solution.

[11] Hartling L, Bellemare S, Wiebe N, Russell K, Klassen TP, Craig W. Oral versus intravenous rehydration for treating dehydration due to gastroenteritis in children. Cochrane Database Syst Rev. 2006;3:CD004390

[12] Hahn S, Kim S, Garner P. Reduced osmolarity oral rehydration solution for treating dehydration caused by acute diarrhoea in children. Cochrane Database Syst Rev. 2002;1:CD002847

- administration of infusion solutions (physiological serum, Ringer's lactate solution), thus ½ of the amount needed in the first 4 hours and then ½ in the remaining 20 hours, to which are added the subsequent losses.
- oral rehydration therapy after a maximum of 24 hours.
- diet

It is desirable, as in any diarrhea, it is the fastest realimentation and the current recommendations exclude transitional deficient diets (carrot, rice, soups, bananas) and it is recommended to return to the previous complete nutrition according to age, without restrictions[13].

The use of antiemetics (metoclopramide) may cause secondary sedation of the child, preventing proper oral rehydration, due to the dopaminergic antagonist mechanism. Ondansetron can be indicated in cases with incorcible vomiting, being well tolerated.
Antidiarrheal - racecadotril (Hidrasec) or diosmectite (Smecta) have a positive effect on AD. Probiotics modulate the immune response and compete competitively on viral attachment loci (Lactobacillus reuteri or Sacharomyces boulardii).

A statistic, compared over a period of 3 years for patients consulted in an outpatient department shows a decrease in rotavirus disease with the correct establishment of vaccine prevention[14].

Good parent information through all possible sources will increase vaccination adherence. A serious impediment is the age at which vaccination is recommended (3-6 months) with 2 doses of oral vaccine.

The annual statistics for outpatient patients look like this:

- 2017-2022 of which AD = 521
- 2018-2328 of which AD = 501
- 2019-3018 of which AD = 511 (Fig 1)

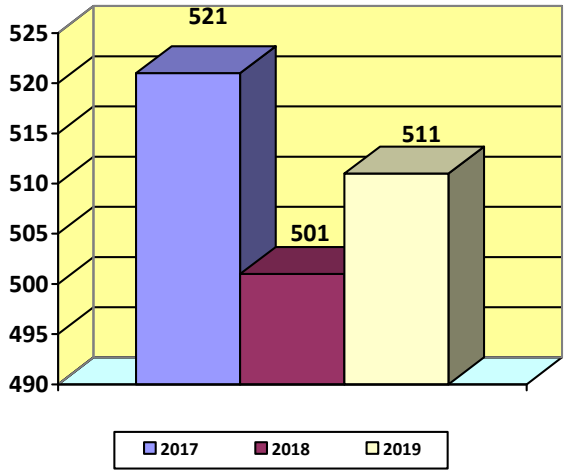

Fig 1 Annual outpatient number

[13] Nelson EA, Ko WK, Kwan E, Leung SF, Poon KH, Chow CB, et al. Guidelines for the management of acute diarrhoea in young children. Hong Kong J Paediatr. 2003;8:203–36

[14] do Carmo GM, Yen C, Cortes J, Siqueira AA, de Oliveira WK, Cortez-Escalante JJ, et al. Decline in diarrhea mortality and admissions after routine childhood rotavirus immunization in Brazil: a time-series analysis. PLoS Med 2011; 8:1001024; PMID:21526228; http://dx.doi.org/10.1371/journal.pmed.1001024; Richardson V, Hernandez-Pichardo J, Quintanar-SolaresM, et al. Effect of rotavirus vaccination on death from childhood diarrhea in Mexico. N Engl J Med. 2010;362(4):299-305. doi:10 .1056/NEJMoa0905211

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Virological tests and stool cultures were performed in all patients with AD and confirmed with rotavirus:

- 2017-203
- 2018-198
- 2019-171

The percentages are 38.96% (2017), 37.52 (2018), and 33.46 (2019). (Fig 2)

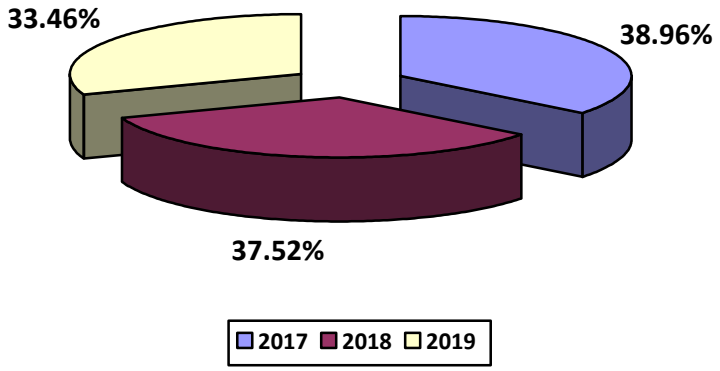

Fig 2. Cases confirmed by stool cultures

There were 71 children in hospitalized in 2017 (34.97%), 62 in 2018 (32.97%) and 51 in 2019 (29.82%), which leads us to conclude that severe forms of disease have diminished.(Fig 3)

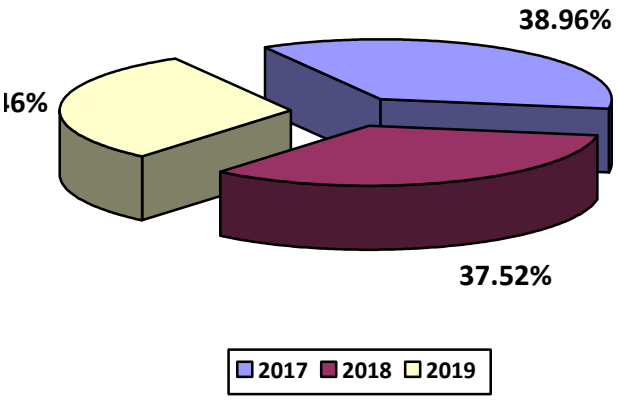

Fig 3 Hospitalized children (%)

Secondary lactose intolerance was noted in some cases, in 2018 - 15 cases and in 2019- 9 cases, requiring an extended diet with lactose milk. The mortality of cases with diarrhea during the 3 years was 0. (Fig 4)

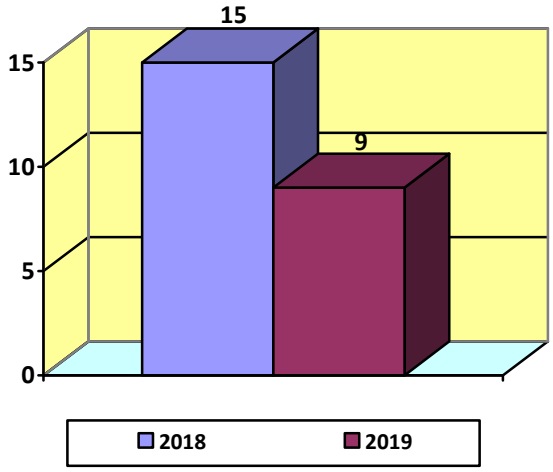

Fig 4 Patients with secondary lactose intolerance

All hospitalized patients were 3 months to 19 months of age.

IN CONCLUSION:

- rotavirus diarrhea is still a common condition in pediatrics
- it is even more severe as the younger age.
- there has been a decrease in the number of cases in the last 3 years
- there is a direct correlation between the severity of the disease, the young age and the need for hospitalization
- the reduction in the number of cases is due to the increased compliance with the specific vaccination
- lactose intolerance remains a possible complication
- oral rehydration gave results in the outpatient setting

• the specific diagnosis (virological tests) is absolutely necessary to avoid "traps" of therapy (eg antibiotics).

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