Therapeutics, Pharmacology and Clinical Toxicology
Vol XXI, Number 2, June 2017
Pages: 51 - 53

CASE REPORT

NEUROLOGICAL MANIFESTATIONS IN A CHILD WITH ACUTE ROTAVIRUS INFECTION

Jugulete Gh.[1,2], Merişescu Mădălina[1,2], Vasile Magdalena[2], Luminos Monica[1,2]

[1] *University of Medicine and Pharmacy" Carol Davila", Bucharest*
[2] *National Institute for Infectious Diseases"Prof. Dr. Matei Balş", Bucharest*

Abstract. Acute rotavirus infection is a health concern both nationally and worldwide because of the high prevalence of the illness, especially in children under the age of 5. The World Health Organization (WHO) reports annually a high number of cases, acute rotavirus infection being one of the main causes of morbidity and mortality in infants. The real incidence of this illness is unknown in Romania mainly due to underreporting, as this condition is frequently found in pediatric and infectious diseases hospitals both as a community-acquired and nosocomial infection. Currently, because of the multitude of manifestations of rotavirus infection in children, many authors have described the concept of rotaviral disease. Frequently reported extra-intestinal manifestations include respiratory, hepatic, cutaneous, renal, and hematological. Neurological manifestations are increasingly reported in the specialty literature. In this present paper we present the case of a pediatric acute rotavirus infection with neurological involvement. An 8 year old child was admitted in the 9th Pediatric Department of the National Institute of Infectious Diseases „Prof. Dr. Matei Bals" with the diagnosis of acute rotavirus infection complicated with ataxia and aphasia. Diagnosis was established on epidemiological (2 siblings with same condition), clinical (fever, vomiting, abdominal pain, diarrhea, gait impairment, aphasia) and laboratory criteria (rotavirus identification on rapid stool antigen test and CSF). Diagnosis was completed with EEG and cranio-cerebral MRI. Evolution was favorable under cortisone, diuretic, human immunoglobulins and symptomatic treatment, with gradual improvement and full recovery after 4 weeks from onset. Rotavirus infection can take shape in a multitude of clinical forms, from mild to severe and complicated. Although rare, neurological complications pose a high risk of sequelae and death in the absence of adequate treatment.

Key words: child, rotavirus, neurological manifestations

Introduction

Acute diarrheal disease represents one of the most important causes of infantile morbidity and mortality worldwide. The World Health Organization estimates that annually, over a billion cases of acute diarrheal disease are registered, with a mortality rate of 5-10 million cases. [1] If in the past bacterial etiology was mainly responsible for infantile mortality through acute diarrheal disease (especially in epidemics), nowadays, with socioeconomic development and the discovery of new antibiotics and vaccines, viruses have become the main cause of acute diarrheal diseases in children. Acute rotavirus infection is one of the most common causes of pediatric acute diarrheal disease, especially in children with a low socioeconomic status or various immunodeficiencies. Some authors estimate that over 95% of children aged 0-5 years are affected. [2, 3] In the European region, WHO estimates that approximately 3.6 million cases of pediatric acute rotavirus gastroenteritis are reported, generating more than 700,000 doctor's appointments, over 100,000 hospital admissions and approximately 230 deaths. [4] In Romania, the real incidence is unknown because of the lack of mandatory reporting of cases and also because of under-diagnosing on a national level (not all cases of pediatric acute diarrheal disease are tested for rotavirus). A study we have carried out in the Pediatric Department of the National Institute of Infectious Diseases over a period of 2 years showed that rotavirus is responsible for 39.8% of all pediatric cases of diarrheal diseases, affecting predominantly children aged 0-4 years (82 %), with a mortality rate of 0.85 % (2 cases with multiple comorbidities). [5, 6]

Merisescu Mădălina
1 Grozovici Street, Postal code 022944, Bucharest, Romania
Email: madalinamerisescu@gmail.com

Acute rotavirus infection causes mostly digestive manifestations (fever, vomiting, abdominal pain, and diarrhea) but sometimes symptoms are severe associated with signs of acute dehydration and even death in the lack of appropriate treatment. The transmission route of the infection is predominantly fecal-oral, but recently some authors have proposed the aerogenic transmission, sustained by the presence of the virus in the nasopharyngeal secretions of patients. [7] By identifying the virus in the respiratory airways of patients with respiratory manifestations would demonstrate de aerogenic transmission of this infection.

The „classic" clinical manifestations of the acute rotavirus infection are no longer of actuality because in the clinical practice we have encountered polymorphic clinical forms of disease, with various extra-intestinal manifestations (neurological, respiratory, renal, hepatic, hematological, and cutaneous). Acute rotaviral disease carries systemic implications with multiple manifestations, and in accordance with socio-economic status, environment and the host's immune status. The usual site of rotavirus infection is the gastrointestinal tract but there is certain research that showed the presence of rotavirus in other sites. [8, 9]

There is little data that attests this concept of systemic illness. This certain topic can be further studied through supplementary investigations that can demonstrate de presence of the rotavirus in various sites. [8, 9]

Clinical presentation

We present a clinical case of acute rotavirus infection complicated with neurological manifestations: aphasia and cerebellitis (cerebellar ataxia). Also we will appraise the severity of associated complications and sequelae.

An 8 year old boy was admitted in the Pediatric Department of the National Institute of Infectious Diseases for fever, vomiting, abdominal pain and later headache, bradylalia, bradypsychia and aphasia. The neurological impairment appeared approximately 5 days after onset of the illness. The patient was not previously known with neurological conditions prior and he had no significant medical history. The patient had 2 brothers with similar gastrointestinal symptoms, both diagnosed with acute rotavirus infection.

Upon admission in our clinic, the patient was feverish, in altered general state, drowsy, pale, with no skin eruptions, dry lips, dry tongue, bradypsychic, bradylalic, slightly tachycardic (100 bpm), normal blood pressure and oxygen saturation, with supple, tender abdomen, loose watery stools, and oliguria. Neurologically, the child presented wide based gait, was unable to sit up and to talk.

Laboratory investigations showed normal blood count, negative inflammatory markers, hypoglicemia, hyponatremia, hypopotassemia, metabolic acidosis, negative stool, urine and blood cultures. Fecal rotavirus antigen test was positive. Lumbar puncture showed clear CSF, with slightly elevated opening pressure, negative Pandy reaction, with 2 elements/mmc. CSF biochemical analysis was normal, negative bacterial latex agglutination, negative CSF cultures, and a positive CSF PCR for rotavirus. Serologies for other viruses were negative (Adenovirus, enteroviruses, Epstein-Barr virus, cytomegalovirus, herpesvirus 1,2).

Other investigations (MRI, EEG, abdominal ultrasound) studies excluded neurosurgical and abdominal pathologies.

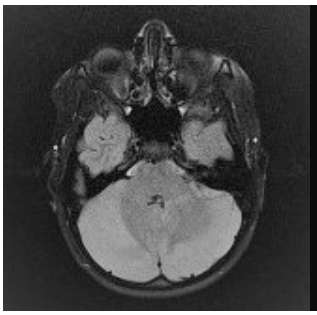

Fig. 1.

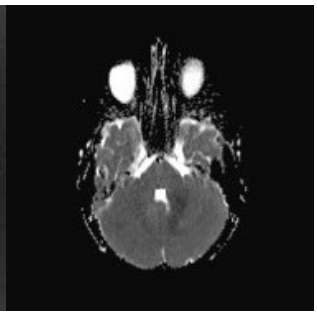

Fig. 2.

MRI showed (fig. no. 1 and 2):

- Hyperintense areas T2 and FLAIR, minimum hypointense T1, without diffusion restriction, cortical and subcortical in the left hemisphere and inferior 1/3 of the right; the left lesion having a mass effect of the 4th ventricle.
- Reduction until disappearance of pericerebral spaces in the left hemisphere and 2/3 of the right hemisphere
- Hyperintense area T2 and FLAIR with diffusion restriction involving the splenium of the corpus callosum – inflammatory/vasculitic lesion
- Hyperintense area T2 and FLAIR, hypointense T1 cortical and subcortical in the occipital and left intraparietal areas.

Sequellary lesions in the left hemisphere.

EEG shows a slow activity suggestive of an acute cerebral injury (fig. no. 3 - 4).

Neurological consult confirms the diagnosis of acute encephalopathy complicated with aphasia and cerebellar ataxia. Based on clinical, epidemiological, and

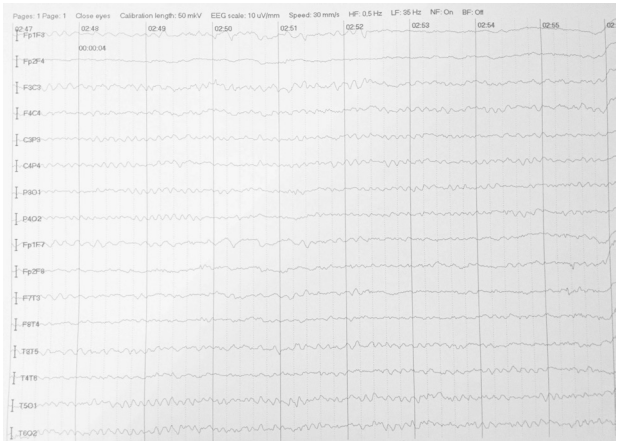

Fig. 3.

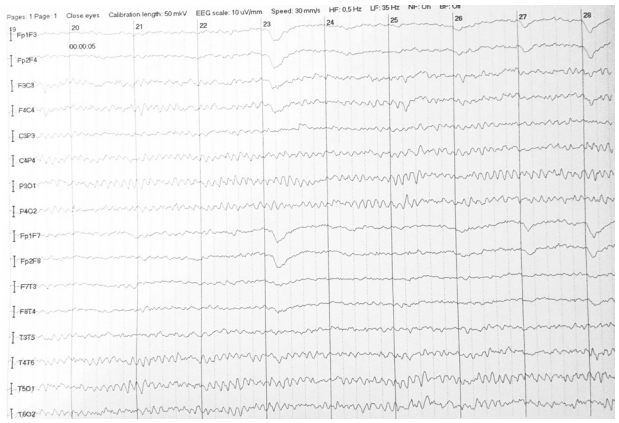

Fig. 3.

laboratory data, the diagnosis was: acute encephalitis secondary to acute rotavirus infection complicated with aphasia and cerebellar ataxia.

The patient received pulse-therapy with methylprednisolone for 3 days then dexamethasone, osmotic diuretic (Mannitol), Cerebrolysine, IV fluids, human immunoglobulins and symptomatic treatment.

Evolution was slowly favorable, with resolution of digestive symptoms, improvement of cerebellar ataxia and persistence of aphasia up to 14 days. Subsequently all neurological manifestations have resolved but the patient remained with a slight mental retardation. Approximately 3 months after, the patient presented an episode of generalized tonic-clonic seizures in the absence of fever, without other symptoms, for which treatment with anticonvulsants was introduced. The patient later received neurological follow-ups.

Discussions

This case confirms the theory emitted by multiple authors regarding extra-intestinal manifestations of acute rotavirus infection. [8, 9] We have been confronted in our clinic with numerous similar cases. [5, 6]

Neurological involvement represents the most severe extra-intestinal manifestation of rotavirus infections and is often accompanied by sequelae. In this particular case, the neurological sequelae required constant monitoring and treatment. It is of the utmost importance to fully investigate a patient with complications associated to the rotavirus infection in order to establish a correct diagnosis and to deter sequelae. In the present case, rotavirus infection left the patient impaired with direct consequences on the family's socio-economical situation. Cases such as this could be avoided but in Romania, rotavirus vaccination is not included in the national vaccination schedule.

Analyzing this case, we can confirm that rotaviral disease can be a potentially severe condition, and prophylaxis must include mandatory vaccination alongside general means of prevention.

Conclusions

Acute rotavirus infection mainly determines digestive symptoms (fever, vomiting, abdominal pain, and diarrhea) but sometimes the clinical presentation can be severe associating signs of acute dehydration and even death in the absence of adequate treatment.

The transmission route is predominantly fecal-oral, but recently some authors support the aerogenic route of transmission, demonstrated by the virus' presence in the naso-pharyngeal secretions7. Identifying the virus in the tracheobronchial tree of patients with respiratory manifestations would demonstrate de aerogenic transmission of this infection.

The „classic" clinical manifestations of the acute rotavirus infection are no longer of actuality because in the clinical practice we have encountered polymorphic clinical forms of disease, with various extra-intestinal manifestations (neurological, respiratory, renal, hepatic, hematological, and cutaneous). This proves that acute rotaviral disease carries systemic implications with multiple manifestations, and in accordance with socio-economic status, environment and the host's immune status. The usual site of rotavirus infection is the gastrointestinal tract but there is certain research that showed the presence of rotavirus in other sites. [8, 9]

Although rare, neurological complications are severe with a high risk of sequelae or death in the absence of adequate and prompt treatment

References

1. Mary M. Agócs, MD, Fatima Serhan, PhD, Catherine Yen, MD, Jason M. Mwenda, MD, Lúcia H. de Oliveira, MSc, Nadia Teleb, MD, PhD, Annemarie Wasley, PhD, Pushpa R. Wijesinghe, MD, Kimberley Fox, MD, Jacqueline E. Tate, PhD, Jon R. Gentsch, PhD, Umesh D. Parashar, MD, Gagandeep Kang, MD, PhD – WHO Global Rotavirus Surveillance Network: A Strategic Review of the First 5 Years, *2008–2012, Morbidity and Mortality Weekly Report.* **2014;63(29):634-637**

2. Parashar UD, Bresee JS, Gentsch JR, Glass RI – Rotavirus. *Emerg Infect Dis.* **1988;4: 561-70**

3. Parashar UD, Gibson CJ, Bresee JS, Glass RI – Rotavirus and severe childhood diarrhea. *Emerg. Infect. Dis.* **2006;12:304-6**

4. Soriano-Gabarró M., Mrukowicz J., Vesikari T., Verstraeten T. – Burden of rotavirus disease in European Union countries. *Pediatr.Infect. Dis J.* **2006 Jan; 25(1 Suppl):S7-S11**

5. Gh. Jugulete - Rotavirus infection is a problem that concerns us all; place of vaccination - *National Interdisciplinary Conference on Antibiotic Therapy in Medical and Surgical Specialties, Bucharest,* **2 - 4 July, 2009.**

6. Gh. Jugulete - Acute rotavirus gastroenteritis in child - *Summer School "Trainer Medicine - Infectious Pathology", organized by "Ovidius" University Constanta in collaboration with U.M.F. "Carol Davila" Bucharest, Constanta,* **16 - 23 July, 2006.**

7. Bass E.S., Pappano D.A., Humiston S.G. – Rotavirus. *Pediatr Rev.***2007 May; 28(5):18391**

8. Scheier E., Aviner S. – Septicemia following rotavirus gastroenteritis.*Isr Med Assoc J.* **2013 Mar; 15(3):166-9**

9. Kang B., Kim D.H., Hong Y.J., Son B.K., Kim D.W., Kwon Y.S. – Comparison between febrile and afebrile seizures associated with mild rotavirus gastroenteritis. *Seizure.* **2013 Sep; 22(7):560-4**