Difficulties of Differential Diagnosis of Organic Injury of the Nervous System in Children

E Yu Skripchenko1,2*, GP Ivanova3, VE Karev1 and NV Skripchenko1,2

1Pediatric Research and Clinical Center for Infectious Diseases, St-Petersburg, Russia
2Saint-Petersburg State Pediatric Medical University, St-Petersburg, Russia
3Railway Clinical Hospital, St-Petersburg, Russia

*Corresponding Author: E Yu Skripchenko, Pediatric Research and Clinical Center for Infectious Diseases, St-Petersburg, Russia.

Received: May 05, 2020; Published: June 17, 2020

Abstract

The growth of organic lesions of the central nervous system (CNS) in children, clinical polymorphism, the similarity of clinical and laboratory parameters in inflammatory, demyelinating and oncological diseases necessitate careful differential diagnosis. The clinical case presented in the article confirms the difficulties of differential diagnosis of organic CNS lesion in children, and therefore it is urgent to expand the indications for a brain biopsy, which will allow to timely diagnose correctly, avoid an erroneous diagnostic search and develop adequate tactics.

Keywords: Organic Injury of the Nervous System; Children; Cytoflavin

Introduction

Nowadays we can observe the growth of organic nervous system damage frequency as a result of inflammatory and hypoxic-ischemic processes [1]. Encephalitis is the most severe form of the pathology in such cases. The severity of nervous system damage, disability frequency and high lethality (4 - 30%) are the main reasons to study such cases [2]. In our early research studies authors have explored [1-4] acute, protracted and chronical (the last one can be atypical) case of encephalitis. In children encephalitis can be without infectious, meningeal and cerebral signs. Normal MRI does not exclude encephalitis, though typical clinical signs of encephalitis and the detection of infectious agents in a blood or cerebrospinal fluid (CSF) when we can be absolutely sure about the diagnosis can be a mask of brain tumor with manifestation as a result of infection [2,6,7].

Case Report and Discussion

We present a clinical case which was severe for differential diagnostics.

Patient K, 12-year-old boy was under treatment in Clinic of neuroinfections and organic nervous system pathology of Pediatric Research and Clinical Center for Infectious Diseases. Early anamnesis: the boy was a second child, the pregnancy was normal, delivery were normal. Physical and mental development was normal. The patient was not allergic and did not have any brain injury. The heredity was burden on father's - the relatives had oncological diseases different localization and even brain. From 9 years old the patient was observed by ophthalmologist with the diagnosis “myopia”.

First sign of the disease was eyes pain which started in February. The ophthalmological diagnosis was “conjunctivitis”. Later the patient had abdominal pain and repeated vomiting. Pediatric diagnosis was “biliary dyskinesia, chronic gastroduodenitis”. Further vomiting have
Difficulties of Differential Diagnosis of Organic Injury of the Nervous System in Children


occurred once a week. Next 2 months the patient returned to school. At the end of March the boy developed repeated vomiting, general weakness, ataxia, whether in the stomach. The patient was hospitalized with the diagnosis "chronic gastroduodenitis". During the day a patient developed neurological signs (ataxia, right hemiparesis). 01/04 the patient was examined by neurologist who suspected encephalitis or tumor. Brain MRI with intravenous contrast has shown several contrast-positive lesions in both hemispheres and right hemisphere of cerebellum, the biggest lesion 17*25 mm was in the region of the posterior sections of the radiant crown on the left, adjacent to the rear parts of the body of the right of the lateral ventricle and spread to the corpus callosum (Figure 1).

**Figure 1:** Brain computer tomography with intravenous contrasting, patient K., 12 years-old. In both brain hemispheres and right cerebellar hemisphere visualised contrast-positive lesions. The largest lesion is in posterior department of right ventricle.

Brain MRI revealed lesions in both hemispheres of the cerebrum, cerebellum and in the brain stem with the involvement of both white and gray matter (Figure 2). The conclusion was that the patient can have demyelinating disease (disseminated encephalomyelitis), infectious process (encephalitis), vasculitis or other local process.

**Figure 2:** Brain MRI of the patient K., 12 years old. Axial, T2-WI, T1-WI, TIRM. Diffusion white matter lesion with involvement of grey matter of brain hemispheres and cerebellum. Volume influence is moderate, ventricles, hemisphere groves are constricted.
The patient experienced chest MRI and in S9 segment of the left lung were visualized solitary intralobar tissue induration. Broncho diameter in lower lobes of both lungs was diffuse dilated. Tracheal and bronchial stroke and cross were normal. Intrachest lymphatic nodules had normal size. Radiological conclusion was about acute bronchiolitis lesions in the left lung.

02/04 neurosurgeons excluded brain tumor according to clinical and radiological findings. 05/04 TB specialist excluded tuberculosis.

During hospitalization the patient was on the following therapy: antiviral - Medovir (Acyclovir) 30 mg/kg/per day, Dexason 1 mg/kg/ per day, Ceftriaxone 1 g/per day; infusion therapy - intravenous Cytoflavin 1 ml/kg/per day №5, Diacarb, Asparcam.

06/04 the patient was transferred to Clinic of neuroinfections and organic nervous system pathology of Pediatric Research and Clinical Center for Infectious Diseases.

After admission the patient was in clear mind, oriented in place and time, he could sit in bed himself, but he needed help to stand or move. Neurological signs: horizontal eye movement restriction, coarse horizontal and vertical nystagmus, increasing in extreme abduction, language deviation. Phonation and swallowing were normal. Palatine and pharyngeal reflexes were normal. Muscular power was decreased in right extremities, more in the leg - up to 3. Deep reflexes were asymmetric D>S. Pathologic reflexes: Babinski symptom, Marinescu-Radovich in both sides, more on the right side. The patient had truncal ataxia and ataxia in extremities, intention while coordinator testing. Sensor examination was normal. Abdominal reflexes were decreased and were worse on the left side. Inner organs examination did not show any abnormalities. Peripheral lymphocytic nodules were normal. Liver and spleen had normal sizes.

Second ophthalmological examination have shown signs of intracerebral hypertension and allergic conjunctivitis. There were no atrophy or optic nerve disc stagnation.

Laboratory results: 07/04 peripheral blood - normal, 08/04 - biochemical blood test - normal, 10/04 - cerebrospinal function - CSF - normal (cytosis 6/3, 6 mononuclear, protein 0,209 g/l). PCR of blood and CSF - herpes virus 1 - 2 types, Epstein-Barr virus (VEB), cytomegalovirus (CMV), herpes 6 type, enteroviruses, toxoplasma, chlamydia, mycoplasma were not detected. Immune cytochemistry of conjunctival smear - herpes simplex 2 type was positive, VEB, CMV, chlamydia, toxoplasma - were not detected. Immune cytochemistry of peripheral blood and CSF - herpes simplex 2 type and herpes 6 type were positive, VEB, CMV, chlamydia, toxoplasma - were not detected. In peripheral blood IgG to CMV, virus herpes 6 type and VEB IgG (NA) were detected. Enzyme immune assay of peripheral blood on IgM and IgG to toxoplasma, chlamydia and mycoplasma were negative. Circulative immune complex (CIC) in CSF 0,057 (normal under 0,05), CIC in peripheral blood 134 (normal under 135), IgM of the peripheral blood 1,1 (normal), IgG 9,0 (normal), IgA 1,1 (normal). Common myelin protein was increased in CSF 5,5 (normal under 5,0).

The diagnosis of the patient - “disseminated encephalomyelitis herpes viral etiology, protracted case” was based on all examinational findings.

The therapy was based on antiviral therapy (acyclovir - Medovir 350 mg*3 times per day intravenously, interferon alpha-2b intramuscularly), neurometabolic (Cytoflavin), dehydration 10/04 and 11/04 the patient got intravenous immune globulin G 7,5g per day (0,25 g/kg per day).

Neurological status 13/04 had positive dynamics: decreased horizontal and vertical nystagmus. The patient was able to move with the help, decreased ataxia, improved appetite. These positive signs saved until 22/04. Patients status started worsening since 23/04: increased focal symptoms, ataxia, nystagmus. Neurosurgeon consulted the patient and third brain MRI was provided. The patient got steroid therapy and was transferred to intensive therapy box. 23/04 in 12 AM the patient developed tonic seizures with mention loss. The patient got Dormicum (midazolam) 10 mg, but in 3 PM the patient developed repeated seizures with respiratory arrest and the patient was
taken on mechanical ventilation. The patient was suspicious to develop subarachnoid and intracerebral hemorrhage during infectious process, brain tumor of antiviral etiology. Cerebrospinal function detected normal parameters (cytosis 5/3, protein 0.209 g/l). Worsening of patients status was associated with the progression of demyelination lesions according to infectious process. Next day the status of the patient has worsened critically, signs of the brain edema were diagnosed. 25/04 on evoked potentials, brain vessels dopplerography and electroencephalogram coma 3 was diagnosed. Despite the therapy-Cytolavin, steroids (dexamose, methylprednisolone, mannitol), antiviral drugs 27/04 at 10 AM the patient developed cardiac arrest and at 10:30 the death was stated.

Pathological examination has shown big tumor of right ponto-cerebellar angle of the brain with germination into right cerebellar hemisphere with perifocal microcirculation disorder (Figure 3). Except that multiple metastases in white matter brain hemispheres and tumor invasion in cortex and pia mater with germination into walls of ventricles, plexus of the right ventricle and structures of subcortical nuclei were diagnosed. Histological examination detected polymorphic cellular glioblastoma (IV malignancy, WHO, 2007), with S-100 expression with high proliferative activity (more than 25% tumor cells - by Ki-67 expression) and scarce vimentin-positive stroma (Figure 4). The reason of the death was pons dislocation with wedging into foramen occipital as a reason of brain edema. Besides generalized herpes virus infection (herpes virus 2 type and 6 type) in brain, lung, thin and thick intestine damage and CMV-sialadenitis was detected (Figure 5 and 6).
Difficulties of Differential Diagnosis of Organic Injury of the Nervous System in Children

Conclusion

This clinical observation shows difficulties of differential diagnostics of disseminated encephalitis and brain tumor, when clinical signs were combined with MRI changes due to infiltrative tumor growth. Tumor growth in this case was accompanied by ischemic and hypoxic disorders which lead to common white and grey hemispheres, pons and cerebellum damage. Diffuse brain MRI signal change and mass-effect absence exclude the possibility of the right diagnosis.

Glioblastoma is known to be high malignancy glioma, which is characterized by multiple necrosis focuses, vessels changes (arteriovenous shunts and blastomatous cell proliferation of adventition and endothelium). Fast tumor growth and hemorrhages in this tumor are known to be accompanied by abrupt deterioration and lethal outcome, which we observed.

Difficulties of Differential Diagnosis of Organic Injury of the Nervous System in Children

This clinical case confirm the necessity of diagnostical brain biopsy in children which can help to avoid long and in some cases wrong diagnostical search and will provide right diagnosis as earlier as possible.

Conflict of Interests

Authors confirm no conflict of interests.

Bibliography


Volume 9 Issue 7 July 2020
© All rights reserved by E Yu Skripchenko., et al.