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# Unspecified Meningoencephalitis with Empiric Antimicrobial Therapy: A Case Report

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**ABSTRACT**

Meningoencephalitis is inflammation of the central nervous system (CNS) including the brain parenchyma, lining of the brain and brainstem.Inflammation in meningoencephalitis can be caused by infectious or non-infectious processes (autoimmune diseases, neoplastic processes, drug reactions).In cases of suspected encephalitis in children, empirical therapy that can be given within the first 6 hours after admission to the hospital without a diagnosis of a cause other than a virus is acyclovir at a dose of 500 mg/m2 or 10 mg/kg every 8 hours at the age of 3 months to 18 years to 14 days. Acyclovir is given because the most common cause is HSV. Steroids may be given if the cause is suspected or streptococcus pneumonia or Haemophilus influenzae. In this case a 6 year old boy came to the emergency room unconscious, the patient was diagnosed with meningoencephalitis. The patient was given antimicrobial drugs in the form of ceftriaxone due to the limitations of antiviral drugs at the hospital. It turned out that there was an improvement in clinical symptoms in children on the 3rd day of treatment which was marked by an improvement in general conditions and a decrease in temperature.

***Keywords:*** meningoencephalitis; antivirals; antimicrobials; ceftriaxone

## INTRODUCTION

Meningoencephalitis is inflammation of the central nervous system (CNS) including the brain parenchyma, lining of the brain and brainstem.[1] Inflammation in meningoencephalitis can be caused by infectious or non-infectious processes (autoimmune diseases, neoplastic processes, drug reactions). Infection can be caused by bacteria, viruses, and parasites. The most common causative bacteria is Streptococcus pneumoniae, group B Streptococcus, *Neisseria meningitidis, Haemophilus influenzae,*[1-3] while the most common viral causes are non-polio enteroviruses (group B coxsackievirus and echovirus), mumps, Parechovirus, Herpesviruses (including Epstein Barr virus, Herpes simplex virus, and Varicella-zoster virus), measles, influenza, and arboviruses (West Nile, La Crosse, Powassan, Jamestown Canyon).[2], [4-7]

Meningitis infection was first described in 1828. In 1990 there were 2.5 million cases worldwide and increased to 2.82 million cases in 2016 globally. In Indonesia alone in 2016 there were reported 78 thousand cases and 4 thousand of them died due to Meningitis.[8], [9]Meanwhile, the incidence of encephalitis is 3.5 to 7.5 per 100,000 people, which is often found in young people and the elderly.[10]Although it can be prevented by vaccines, encephalitis remains the focus of various studies because it causes high mortality and morbidity. CNS infections can cause behavioral, mental health and neurological disorders, especially if the infection occurs during childhood and also adults in developing countries.[11]

The magnitude of the disturbance caused by encephalitis as well as the high mortality and morbidity rates make it important to pay attention to proper diagnosis and therapy even with various limitations.

Therefore, we present a case report in a patient with encephalitis where the most common case is caused by a virus and various current managements are given antivirals first but the patient is given antimicrobials.

## CASE PRESENTATION

A 6-year-old boy comes to the emergency room unconscious after having three repeated seizures with the longest duration of 15 minutes. The patient is unconscious during the seizure. Three days before admission to the hospital, the patient experienced vomiting after eating and diarrhea 10 times per day for 2 days. Fever felt by the patient since 1 day before admission to the hospital. The patient had never experienced seizures, trauma or a history of previous illness. Developmental history according to the stages of development. Complete immunization history to booster. Family socio-economic enough. On physical examination, normal stature showed adequate nutrition, temperature $40^0$C, sunken eyes, dry lip mucosa, increased bowel sounds, positive neck stiffness and no abnormalities on cranial nerve examination.

On blood examination found leukocytosis (13,300/uL), urinalysis within normal limits, stool examination found mucus, leukoist, bacteria. Thorax photo has Bronchopneumoniae impression and CSS fluid analysis results show clear, leukocytes 10/uL, erythrocyte 0/uL, lymphocyte predominance, protein 5g/dL, glucose 60mg/dL and CSS culture results are negative.

The patient was finally treated in the incentive room and given antimicrobial drug therapy in the form of Ceftriaxone 2000 mg/24 hours for 5 days, Dexamethasone for 5 days.

On the 3rd day of treatment, the patient's condition was getting better which was marked by improved awareness and temperature 36.7$^0$C, the patient was then transferred to the usual ward. On the 4th day of treatment in the usual ward, the patient's consciousness recovered and then the next day the patient was sent home.

**DISCUSSION**

Meningoencephalitis is an emergency in neurology. Meningoencephalitis has symptomsfever accompanied by involvement of brain damage (decreased consciousness, cognitive impairment, behavioral disturbances, focal neurological disorders, and seizures) and there are also signs of meningeal irritation.These symptoms are often accompanied by secondary symptoms in the form of respiratory tract infections, gastrointestinal symptoms, skin rashes associated with the causative pathogen.[12]

The diagnosis of meningocephalitis itself can be established by analysis of the cerebrospinal fluid (CSS) through a lumbar puncture. CSS analysis examination can be performed to differentiate viral and non-viral infections. Analysis of CSF fluids for viral causes showed cell count of <1000/mm3, dominant lymphocytes, normal glucose, normal/increased protein, whereas in bacteria, cell count of >1000/mm3, dominant neutrophils, decreased glucose and increased protein.[13]Polymerase chain reaction (PCR) is also often used to diagnose viral meningitis to find out the pathogen that causes this disease.[12]

In cases of suspected encephalitis in children, empirical therapy that can be given within the first 6 hours after admission to the hospital without a diagnosis of a cause other than a virus is acyclovir at a dose of 500 mg/m2 or 10 mg/kg every 8 hours at the age of 3 months to 18 years to 14 days.[14–17]Acyclovir is given because the most common cause is HSV. Steroids may be given if the cause is suspected or streptococcus pneumoniaHaemophilus influenzae.[18]

The use of antimicrobials, especially Ceftriaxone, was found in several studies. In HHV 6 therapy with ceftriaxone is used as empiric therapy and conditions that previously had a fever are no longer feverish.[19]Ceftriaxone is used as empirical therapy in cases of meningitis and encephalitis at a dose of 2000 mg at 12 hourly intervals for 7 days.[20]

In this case the patient was treated using an antimicrobial in the form of Ceftriaxone at a dose of 2000 mg/24 hours for 5 days which was not in accordance with recent studies for empirical treatment of acute encephalitis due to limitations of parenteral acyclovir which was not available in the hospital, but with the administration of this antimicrobial therapy it turned out that the patient experienced improvement in consciousness, afebrile state, and seizure-free after administration of Ceftriaxone.

**CONCLUSION**

Meningoencephalitis is an emergency case in neurological cases. Although the most common etiology of encephalitis is viral, there is still a place for the use of antimicrobials such as Ceftriaxone. The use of Ceftriaxone may be used as empiric therapy in encephalitis, especially in hospitals that have limited access to antiviral therapy, although further research is still needed on a larger scale.

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