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CASE REPORT

# Seizures due to Meningitis in Hydrocephalic Child with History of Myelomeningocele – A Case Report

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## ABSTRACT

Meningtis or inflammation of meninges may be due to bacteria, virus or fungi. It mostly occurs in the first 2 years of life due to low immunity and high vascularity of the brain. Diagnosing meningitis is a straight forward lumbar puncture procedure, but in this case the patient suffered from hydrocephalus due to Arnold chiari type 2 malformation and had a history of myelomeningocele. This report discusses the procedure of diagnosis and treatment in this case.

**Key Words:** Hydrocephalus, Meningitis, Myelomeningocele, Seizures,

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## Introduction

Seizures refer to abnormal electrical activity in the brain which may be caused by a number of factors such as trauma (which include cerebral contusion), stroke, congenital anomalies, birth injury, degenerative cerebral disease, hydrocephalus, infections like meningitis , brain abscess, encephalitis, tuberculosis, and metabolic disorders such as hypercalcemia, hypoglycemia, hyponatremia and toxins.

Most frequently, children who have fever and seizures are suspected of meningitis, as the convulsion may represent the sole manifestation of bacterial meningitis. Clinical presentations of 503 consecutive cases of pediatric meningitis were studied to determine what proportion of the patient population had seizures as the sole manifestation of meningitis. No cases of occult bacterial meningitis were found.[1] Thus febrile seizures solely are a rare manifestation.

## Case Report

A three-and a half-year-old male reported to emergency department of Akbar Niazi Teaching Hospital with fever for the last 2 days and seizures for the past 15 minutes.

The fever was sudden in onset, continuous, high grade, about 102˚F, not associated with rigors and chills and relieved temporarily with antipyretics.

Seizures were generalized tonic-clonic type and associated with rolling up of eyes, frothing from the mouth as well as fecal and urinary incontinence. Patient was given I/V diazepam. History of urine dribbling was found. Furthermore, there was no history of vomiting, abdominal pain, diarrhea, cough, headache, skin rash or joint swelling. At birth, the child was diagnosed with meningomyelocele in the lumbrosacral area and was surgically treated at PIMS at 3 months of age. The patient had also previously been hospitalized for febrile seizures due to upper respiratory infection, two years back.

During pregnancy, the mother took Folic acid and calcium supplements and attended all the prenatal visits and scans. She had no history of epilepsy. The patient was delivered full term in the hospital with a birth weight of 2800 grams.

Developmental history revealed that his gross motor skills were delayed, as he began walking with support at 2 years and still could not walk without support. Speech, hearing and vision were normal. The patient had been breast fed till 6 months followed by weaning. However, nutritional history indicated that caloric intake had decreased from 1200 Kcal to 600 Kcal. Vaccination according to EPI schedule was complete. There was no history of Meningomyelocele, seizures or developmental delay in the family.

On clinical examination, the patient had a large head, clubbed feet (Figure 1) and a scar mark on the back in the lumbrosacral region (Figure 2) because of a previous surgery. There was no clubbing, cyanosis, jaundice, lymphadenopathy or pedal edema. Vital signs included a pulse with a rate of 112 /minute, which was regular low volume, normal character and showed no radio-femoral delay. Temperature was 102˚F, respiratory rate was 30 breaths/minute, and blood pressure was 100/60 mmHg. Abdominal examination showed slight tenderness of right lumber area, however there was no viceromegaly.

**Figure 1: Clinical picture of patient**

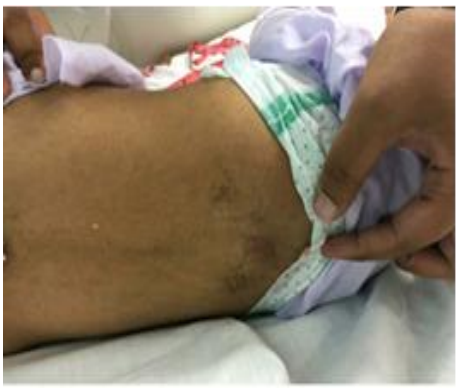

**Figure 2: Examination of lumbosacral area**

On CNS examination sunset sign was positive, anterior fontalle was 0.5 cm palpable, neck stiffness was seen but Kernig's and Brudzinski's signs were absent. Hypotonia of both lower limbs was observed with no sensation in feet up to the calf. Knee, ankle and planter reflexes were bilaterally absent. No significant cardiovascular or respiratory findings were found.

Anthropometric measures indicated weight 13 kg at 10th centile, height 94 cm at 10 centile (Figure 3) and Head circumference 56 cm above 97th centile.

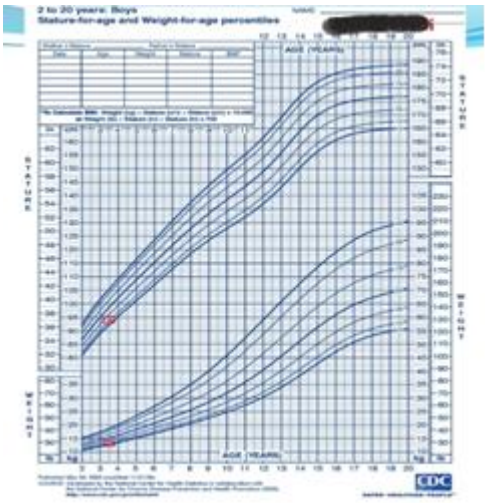

**Figure 3: Graph showing anthropometric measures**

According to laboratory findings, complete blood count indicated low red blood cell count (4.61 million/$mm^3$), reduced Hemoglobin (10.8 g/dl) and raised lymphocytes (50%). Metabolic work-up indicated raised serum sodium (130 mEq/L) and serum phosphorous (5mg/dl). Routine examination of urine was normal, but on culture and sensitivity isolated E. Coli which was sensitive to Ceftriaxone. Ultrasound KUB and Renal function tests

were normal. CT of brain indicated basal meningeal enhancement suggestive of meningitis (Figure 4).

Moderate dilation of 2nd and 3rd ventricle and sparing of 4th ventricle indicated obstructive hydrocephalus due to aqueductal stenosis or following meningomyelocele surgery. The 4th ventricle appeared pinched at the foramen magnum. The diagnosis of Hydrocephalus due to Arnold Chiari malformation /aqueductal stenosis, Meningitis, and UTI was made.

The patient's family was informed about the diagnosis and treatment was started with I/V ceftriaxone for 14 days. Patient became stable, afebrile and seizure free, and was given a management plan, which included anthropometry, developmental assessment, rehabilitation and second opinion for neuro surgery and was later discharged.

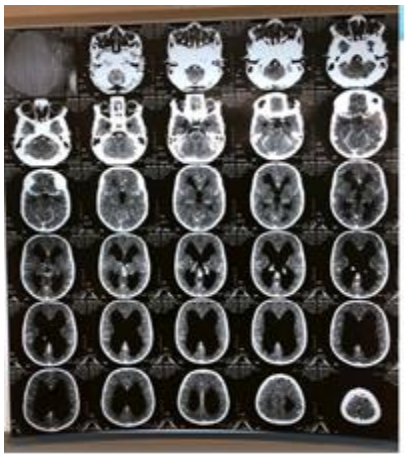

**Figure 4: CT scan of brain**

## Discussion

Meningitis is defined as inflammation of the membranes that surround the brain and spinal cord.[2] The swelling typically triggers symptoms such as headache, fever and a stiff neck and may progress to seizures and lethargy. It can be caused by bacteria, viruses or fungi. Children exhibit seizures in acute meningitis. According to a study published in the New England Journal of Medicine, seizures occurred in 58 patients (31% percent) during the acute phase of bacterial meningitis. In 39 patients, the seizures were clearly partial, generalized with focal predominance, or partial with secondary generalization.[3]

Bacterial meningitis starts as an infection of the upper respiratory tract, followed by invasion of the blood from the respiratory focus, seeding of the meninges by the blood-borne organism and lastly, inflammation of the meninges and brain. Early diagnosis is important as a child can suffer severe neurological deficits.

Lumbar puncture is the investigation of choice in ruling out meningitis but there are certain instances when it is contraindicated such as in case of increased intracranial pressure.[4] Thus, our diagnosis was based on clinical findings.

Repeated meningitis is observed in patients of meningomyelocele, which is a neural tube defect. Myelomeningocele closure when delayed, by more than one day after birth, is associated with an increased rate of infection.[5]

Treatment with I/V Ceftriaxone is very effective for the treatment of meningitis, as Ceftriaxone enters the cerebrospinal fluid. The average bactericidal activity of ceftriaxone in CSF, 1 hour after a dose is at least 60 times greater than that of ampicillin or chloramphenicol.[6]

## Conclusion

The patient was diagnosed with meningitis on clinical grounds and CT scan findings. Lumbar puncture was not performed due to Hydrocephalus caused by Arnold Chiari malformation type 2, as this would have been life threatening for the patient. The late closure of myelomeningocele is a suspected risk in development of meningitis. The patient also suffered from urinary tract infection that made him susceptible to meningitis due to poor blood-brain barrier. Patient was treated with a 14-day intravenous infusion of Ceftriaxone and was discharged on recovery.

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