ABNORMAL PREDOMINANTLY FRONTAL HIGH VOLTAGE AND SLOW EEG FINDINGS WITH ACUTE ENCEPHALOPATHY ASSOCIATED WITH ACUTE FOCAL BACTERIAL NEPHRITIS

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Received April 3, 2020 – Accepted May 14, 2020

To the Editor,

Acute focal bacterial nephritis (AFBN), an inflammatory lesion of the renal parenchyma caused by localized bacterial infection of the kidney, was first described by Rosenfield in 1979 (1). The AFBN stage is considered to be the transition from acute renal pelvic nephritis to renal abscess (1). In recent years, a few researchers reported cases of AFBN associated with central nervous system symptoms (2-5). Here, in this paper, we report a rare case of a AFBN that was associated with fever and impaired consciousness. This case was initially diagnosed as acute encephalopathy based on the high-voltage amplitude and slow wave pattern observed on electroencephalogram (EEG).

The case was a 12-year-old male patient who visited a clinic complaining of fever and fatigue. The clinic associated the symptoms to common cold and the patient was returned home. The patient gradually developed speech difficulties which eventually affected his communication ability. The next morning, after a walk around his house he experienced severe vomiting and a few hours later, he stopped responding to his parents and was not able to recognize the members of his family. At this level, his consciousness gradually deteriorated, and he was transported to our university hospital by an ambulance. After admission and hospitalization, he exhibited a disturbed level of consciousness and acted irrationally and started shouting while walking around the hospital general ward. His body temperature was 40°C, and physical examination did not reveal any physical abnormality on his body. His deep tendon reflexes were normal, with no difference between the right and left sides. We instructed him to perform finger-to-nose test, Romberg test and dancing toe walking test; but he could not comprehend any of the test instructions. The blood test results were $15{,}800\times10^9$/μl for white blood cells (WBC) and 5.72 mg/dL for C-Reactive protein (CRP), suggesting some focal bacterial infection. His urine test results revealed normal values for protein, glucose, red blood cells, WBC, and β2-microgloburin. Cerebral spinal fluid collection with lumbar test showed normal findings with no increase in the cell count, protein level, glucose and IgG index. Following this, the patient exhibited violent movement along with impaired consciousness. Thus, we performed an EEG examination and recorded high voltage and slow delta wave activities predominantly for both frontal areas (Fig. 1 A, B). Brain magnetic resonance imaging (MRI) and diffusion-weighted imaging (DWI) results showed no abnormalities. Based on symptoms and EEG results, we diagnosed him as a case of acute encephalopa-

Key words: AFBN; acute encephalopathy; electroencephalogram; DWI; MRI

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0393-974X (2020)

thy. We started steroid pulse treatment with 30 mg/kg methylprednisolone for 3 days. Six hours after the steroid pulse treatment, he regained consciousness rapidly and his verbal response was normalized the next morning. On the fourth day after admission, his body temperature increased again to 40°C and the blood WBC, CRP, ferritin, procalcitonin, and IL-2R levels were 14,000×10^9/μl, 21.13 mg/dl, 105 ng/ml, 13.36 ng/ml and 1,029 U/ml, respectively. Moreover, the BUN, creatinine, and sodium levels were 23 mg/dL, 1.2 mg/dl, and 135 mmol/L, respectively. At this point we started to identify the source of the bacterial infection. Data obtained from the blood test and the abdominal enhanced CT showed a low-density area in the left kidney (Fig. 2A). Additional brain MRI-DWI revealed normal intensity, and abdominal MRI-DWI exhibited wedge-shaped high signal intensities in the left kidney (Fig. 2 B, C). These abnormal intensities were compatible with AFBN diagnosis. We started a 10-day antibiotic treatment with 4 g/day of ceftriaxone. After antibiotic therapy his general condition gradually improved. Urine culture test revealed no specific infection and magnetic resonance cholangiography results were normal. Renal ^{123}I-meta-iodobenzylguanidine single photon emission computerized tomography showed lower left renal uptake compared to the right. After a few years of follow-up, his left kidney function was maintained and brain recognition was normal.

In previous studies on the central nervous sys-

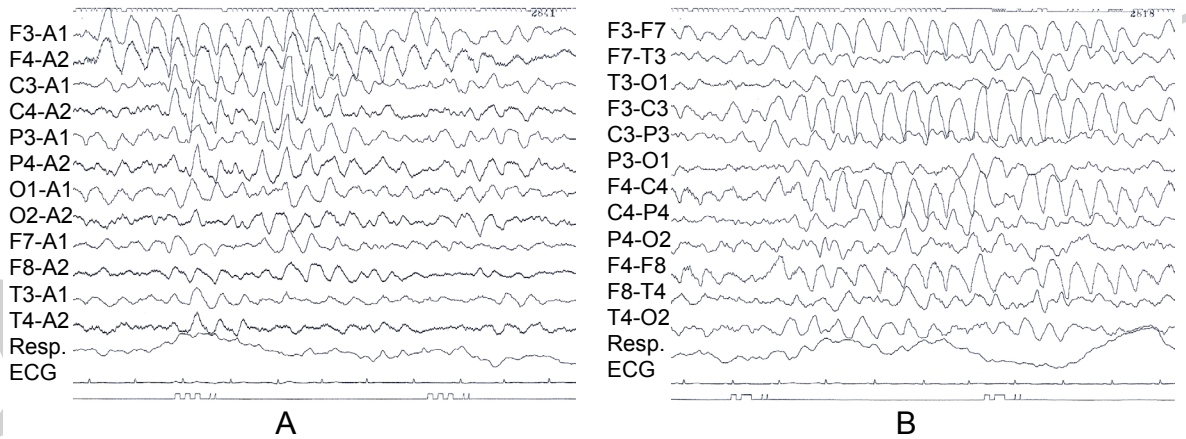

Fig. 1 . ***A)*** *Monopolar pattern of EEG shows high voltage and 2 Hz slow wave activities predominantly in both frontal areas.* ***B)*** *Bipolar pattern of EEG detected abnormal high voltage slow wave activities.*

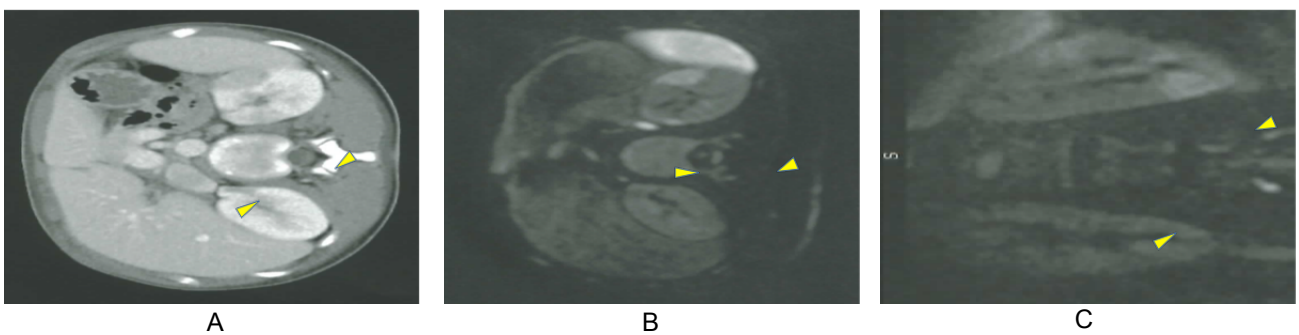

Fig. 2. ***A)*** *Enhanced CT image showing a low-density abnormal area in the left kidney (arrows).* ***B,C)*** *Abdominal MRI-DWI reveals wedge-like shaped high signal intensities in the left kidney (arrows).*

tem symptoms associated with AFBN, researchers have reported abnormalities in MRI results. These abnormalities included clinically mild encephalitis/encephalopathy with reversible splenial lesion (MERS) (2-4), reversible posterior leukoencephalopathy syndrome (RPLS) (4), and acute encephalopathy with biphasic seizures and late reduced diffusion (AESD) (5). Our patient underwent two MRI scans at different phases, and neither of them showed any MERS abnormalities. Moreover, our case was diagnosed based on abnormal frontal dominant high voltage slow EEG results. The main symptoms in our patient included consciousness disorder, along with visual and behavioral abnormalities. Our patient did not experience any convulsions. We assumed that our case was a non-convulsive acute encephalopathy case, which was clinically similar to MERS. This might be one of the most clinically mild types of a novel encephalopathy among the various types of acute childhood encephalopathy cases. Acute encephalopathy with normal MRI and abnormal high voltage and slow activity EEG findings associated with AFBN may be categorized as a new clinical phenotype of acute encephalopathy with milder clinical symptoms compared to MERS. In cases with symptoms of central nervous system anomalies that are suggestive of acute encephalopathy, clinicians should perform both EEG and MRI if the case is diagnosed as AFBN. It may be possible to diagnose AFBN associated with MERS as well as AFBN associated with normal MRI findings and abnormal high voltage and slow EEG wave patterns, similar to our case of acute encephalopathy.

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