Insights of Clinical and Medical Case Reports

Case Report

Magnetic Resonance Imaging Features of Reversible Splenial Lesion Syndrome with Organic Manic Disorder and Hypokalemia: A Case Report

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1. Abstract

Reversible splenial lesion syndrome (RESLES) is a rare clinical imaging syndrome which is characterized by magnetic resonance imaging (MRI) findings of reversible abnormal signals in the splenium of the corpus callosum (SCC). RESLES is a single-stage non-specific syndrome with unclear pathogenesis. We report a female patient of 23-year-old who presented with organic manic disorder and hypokalemia after encephalitis. Brain MRI showed an ovoid isolated lesion in the SCC, which exhibited hyperintensity on diffusion-weighted imaging and hypointensity on apparent diffusion coefficient and T1-weighted imaging. The identification of these features improves our understanding of the imaging characteristics of RESLES, thus enabling clinicians to better understand this disease and correctly establish its diagnosis.

2. Keywords: Splenial lesion syndrome; Corpus callosum; Magnetic resonance imaging; Organic manic disorder; Hypokalemia

3. Introduction

Reversible splenial lesion syndrome (RESLES) is a spectrum of disorders radiologically characterized by reversible lesions mainly involving the splenium of the corpus callosum (SCC) [1], and first identified by Tada et.al [2]. RESLES commonly occurs in patients with seizures, infections, malnutrition, antiepileptic drug withdrawal, and metabolic disturbances, et.al [1,3]. Brain magnetic resonance imaging (MRI) abnormalities are commonly by transient splenial lesions with high signal intensity on T2-weighted imaging (T2WI), fluid-attenuated inversion recovery imaging (FLAIR), and diffusion-weighted imaging (DWI) and hypointensity on T1-weighted imaging (T1WI) without contrast enhancement [4]. Typically, the clinical symptoms of RESLES include mildly altered states of consciousness, delirium, and seizures after a range of previous viral infections [5].

4. Patient Information

A previously healthy 23-year-old female presented with a history of encephalitis and fever one year ago. On admission, she was speech disorder and hypokalemia for two weeks, with a temperature of 36.2°C. The patient's visual space and executive ability, attention, abstract thinking, and short-term memory were slightly impaired. Then, the patient was given olanzapine and potassium chloride tablets treatments. Neurological examination on admission showed poor mental status and temper, excitement state, and positive neck rigidity. Other neurological signs were negative.

5. Clinical Findings

5.1. Tests on Admission

The ratio of red blood cell volume distribution width (RDW) was 16.6% (reference range:10.0%-15.0%), the mean corpuscular volume (MCV) counts were 79fl (reference range:82-100 fl). The level of mean corpsular hemoglobin (MCH) was 25 pg (reference range:27-34 pg). Creatinine (CREA) was 43.4umol/L (reference range:45.0-110.0 umol/L). Homocysteine (HCY) was 16.0 umol/L (reference range:0.0-15.0 umol/L), kalium (K) was 3.22mmol/L (reference range:3.50-5.30mmol/L) and other examinations were normal. Immune infections disease screening examination results were normal. The electroencephalogram showed normal waves.

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5.2. MRI Observations

The SCC showed an ovoid isolated lesion with decreased signal intensity on T1WI and increased signal intensity on T2WI and FLAIR. DWI demonstrated hyperintensity, resembling 'boomerang sign' (Figure 1d). The mean apparent diffusion coefficient (ADC) value was 0.491 × 10—3 mm2/s (Figure 1e).

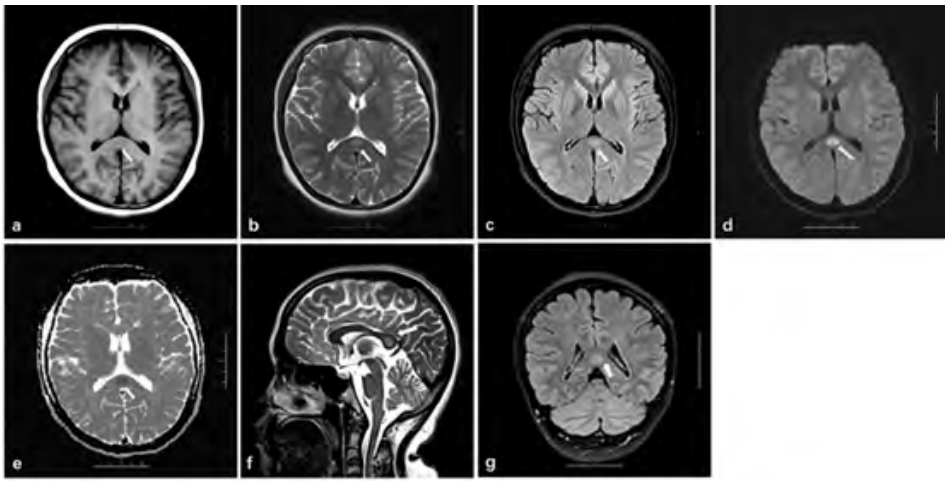

Figure 1: MRI showed an isolated oval lesion in the SCC (arrows) with slight hypointense on T1WI (b), slight hyperintense on T2WI (a) and T2- FLAIR (c), hyperintense on DWI (d), decreased ADC values (e), the sagittal (f) and coronal (g) T2-FLAIR showed the same lesion. MRI, magnetic resonance imaging; SCC, splenium of the corpus callosum; T1WI, T1-weighted imaging; FLAIR, fluid attenuated inversion recovery; DWI, diffusion weighted imaging; ADC, apparent diffusion coefficient.

6. Discussion

RESLES is a new clinical radiological syndrome, and it was initially reported as mild encephalitis/encephalopathy with a reversible splenial lesion (MERS) by Tada et al. [2]. Monco JC et al. [1] described the clinical imaging features of RESLES, which was defined as a clinical and radiological syndrome of a unique benign process dominated by reversible lesions in the SCC. Clinically, the etiologies of RESLES were complex, and associated with a wide range of diseases and conditions, such as mild encephalitis/encephalopathy, discontinuation of antiepileptic drugs, viral infection, high-altitude cerebral edema, poisoning or metabolic disorders and tumors [6-10]. Infection associated with encephalitis were the most common reasons [11], which was similar to our findings in the present report.

The pathophysiological mechanisms of RESLES remain unclear. The main pathological changes in RESLES are the accumulation of intracellular fluid and sodium, which result in the swelling of neurons and astrocytes [12]. Clinical manifestations of central nervous system (CNS) include epileptic seizures, impaired consciousness, behavior changes and hyponatremia caused by inappropriate antidiuretic hormone syndrome [13,14]. In the present report, we described the rare clinical manifestations and typical imaging features of an adult woman with organic manic disorder and hypokalemia complicated with RESLES for the first time.

According to the previous literature, some researchers have proposed the diagnostic criteria of RESLES as follows [2]: (1) mild CNS damages, such as impaired consciousness; (2) high signal intensity lesion on DWI; (3) lesion disappearance with relief of clinical symptoms. The clinical manifestations and imaging features of the present case completely met the above criteria except the (3), as there is no follow-up imaging.

RESLES is classified into two types according to the lesion location [15]: type I, a small isolated lesion, which is usually round or oval; type II, SCC lesion extending into white matter and/or entire corpus callosum. The radiological features of type I could also be a part of the type II in the course of the RESLES, the type I has better prognosis than that of type II [9]. In the present report, the patient was a RESLES type I case.

Brain MRI is the optimal imaging modality for identifying lesions in the SCC. Typical MRI characteristics of RESLES are usually reversible, nonenhanced rounded or oval lesions located in the SCC; isointensity to slight hypointensity on T1WI, hyperintensity on T2WI, FLAIR, DWI, and a decreased ADC value of the lesion on ADC maps [16].

7. Conclusion

In conclusion, we reported the case of RESLES following encephalitis with organic manic disorder for the first time. And hypokalemia may be a contributing factor of RESLES. Clinicians should be aware of how to identify and diagnose RESLES in clinical practice and its exact pathophysiological mechanism needs to be further studied.

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