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Case Report

Mild Encephalopathy with Reversible Splenial Lesion (MERS) in a Pediatric Patient: A Case Report and Review of Literature

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Abstract

Mild Encephalopathy with Reversible Splenial Lesion (MERS) is a clinico-radiological syndrome characterized by transient neurological symptoms and a distinct MRI finding of a reversible lesion in the splenium of the corpus callosum (SCC). This case report discusses a 12-year-old male who presented with recurrent migraine headaches associated with visual aura, vomiting, and photophobia, coinciding with an upper respiratory tract infection. MRI revealed a well-circumscribed lesion in the SCC, consistent with MERS. Symptoms improved with symptomatic treatment and lifestyle modifications, including reduced screen time. This case underscores the significance of recognizing reversible splenial lesions in the context of viral infections and highlights the importance of appropriate imaging to avoid misdiagnosis. The management of MERS emphasizes supportive care and symptomatic treatment, as the prognosis is generally favorable, with most patients recovering fully without lasting complications.

Keywords: Mild Encephalopathy; MRI; Splenium of the Corpus Callosum (SCC)

Introduction

Mild Encephalopathy with Reversible Splenial Lesion is a rare, self-limiting neurological condition characterized by transient encephalopathy and a reversible lesion in the splenium of the corpus callosum on MRI. Often linked to viral infections, MERS presents with symptoms such as confusion, ataxia, and seizures, resolving without long-term effects.

This case report describes a 12-year-old male with recurrent migraines and an upper respiratory tract infection, found to have a transient SCC lesion on MRI. It highlights the importance of recognizing MERS in pediatric patients and emphasizes supportive care to prevent misdiagnosis and unnecessary interventions.

Case Presentation

We report a case of a 12-year-old male presenting with recurrent migraine headaches associated with visual aura, vomiting, and photophobia. For the past year, he experienced monthly headaches lasting one day, with the longest episode extending to two days. Each episode was characterized by visual hallucinations at the onset, described as "bridges in the sky" or "black curtains falling," followed by vomiting (1-2 times per episode) and photophobia. Sleep helped reduce the severity and duration of the episodes, and the headaches were alleviated with Paracetamol.

The patient was born full term via normal vaginal delivery following a smooth pregnancy without complications. He is currently in grade 6, with good school performance, but extensive screen time due to iPad use at school. He has a good appetite, plays football regularly, and appears well. Family history is notable for migraines in the paternal grandfather and aunts. There is no parental consanguinity, and he has four siblings. On examination, he was conscious, cooperative, and oriented to time, place, and person (CCOx3). His deep tendon reflexes (DTR) were brisk (++), his weight was 42.6 kg (50th percentile), and his height was 157 cm (90th percentile).

At the time of presentation, the patient had an upper respiratory tract infection (URTI), coinciding with the influenza A season. Brain MRI with and without contrast revealed an oval, well-circumscribed lesion in the splenium of the corpus callosum measuring 0.8 × 1.3 × 0.8 cm. The lesion appeared mildly hyperintense on T2/FLAIR images and mildly hypointense on T1-weighted images, with restricted diffusion but no significant enhancement or mass effect. These findings were consistent with MERS Type I. Given the temporal association with his viral infection, it is likely that his migraine was triggered by MERS rather than MERS being the cause of his longstanding migraines.

This case highlights the importance of recognizing reversible splenial lesions in the setting of infection and migraine. If the MRI had not been performed at the time of infection or had been delayed by a few weeks, the MERS lesion could have been easily missed. The benign and self-limiting nature of MERS was emphasized, with

management focused on addressing migraine symptoms through Paracetamol, rest, and lifestyle modifications, including reducing screen time and ensuring regular sleep patterns.

The MRI of the brain was repeated after four weeks and returned completely normal, indicating resolution of the previous MERS, with no headaches reported during the interval. This case underscores the necessity of considering transient neurological imaging findings in the context of intercurrent illness to avoid unnecessary interventions and ensure appropriate clinical interpretation.

Discussion

Mild Encephalopathy with Reversible Splenial Lesion is a clinico-radiological syndrome marked by transient encephalopathy and a characteristic MRI finding—a reversible lesion in the SCC. It is commonly linked to viral infections but may also arise from metabolic imbalances or specific medications [1-3].

MERS manifests with various neuropsychiatric symptoms, such as confusion, irritability, lethargy, seizures, and ataxia, which are generally mild and resolve within days to weeks. Diagnosis relies on MRI, which reveals a hyperintense lesion in the SCC on diffusion-weighted imaging (DWI) and T2-weighted sequences, typically disappearing over time [1,2,4].

The exact pathophysiology of MERS remains unclear, but it is believed to involve transient cytotoxic and intramyelinic edema, potentially triggered by inflammatory responses or metabolic imbalances. The prognosis is typically very good, with most patients achieving full recovery without lasting complications [2,4,6].

Historical

MERS was first described in 2004 by Tada., *et al*. in the journal *Neurology*. This study retrospectively analyzed 15 patients with encephalitis/encephalopathy and a reversible isolated splenium of the corpus callosum lesion on MRI to identify common clinical features. All patients experienced mild CNS manifestations, with 12 presenting consciousness disorders and 8 having seizures, three of whom required antiepileptic drugs. Despite these symptoms, all patients fully recovered within a month, with 8 improving within a week. MRI findings showed ovoid or irregular SCC lesions with homogeneously reduced diffusion but no enhancement, and all lesions resolved within 3 days to 2 months. These findings suggest a consistent clinical pattern of mild symptoms and rapid recovery in affected patients [7].

MRI brain findings

MERS is defined by distinct MRI characteristics. The key feature of MERS on MRI is the presence of a reversible lesion located in the SCC, which typically manifests as an ovoid or round area with altered signal intensity.

On MRI, the SCC lesion exhibits the following features:

- Hypointensity on T1-weighted imaging (T1WI)
- Hyperintensity on T2-weighted imaging (T2WI)
- Hyperintensity on fluid-attenuated inversion recovery (FLAIR) sequences
- Hyperintensity on diffusion-weighted imaging (DWI)
- Reduced apparent diffusion coefficient (ADC) values, indicating restricted diffusion [1,8-11].

These imaging features are essential for distinguishing MERS from other conditions, such as ischemic stroke. The lesion usually resolves within a few weeks and often leaves no significant residual changes [1,8,9,11].

In certain instances, additional lesions may be found in other areas of the corpus callosum or surrounding white matter; however, these occurrences are less common [2]. Another noteworthy characteristic is the lack of significant gadolinium enhancement [8,9].

Causes

Various pathogens have been linked to MERS, with both influenza A and B viruses frequently reported as causes. Other associated pathogens include Respiratory Syncytial Virus (RSV), adenovirus, rotavirus, Mycoplasma pneumoniae, Human herpesvirus 6 (HHV-6), cytomegalovirus (CMV), rhinovirus, parainfluenza virus, Epstein-Barr virus (EBV), and dengue virus [2,12,13].

Children are particularly vulnerable to MERS, a syndrome that primarily affects the pediatric population and exhibits specific age-related patterns. Research indicates that MERS cases display two distinct peaks in age: between 1 to 3 years and 7 to 8 years. In children aged 6 years and younger, intestinal infections, especially those caused by rotavirus, are more prevalent, with convulsions being the most common symptom. Conversely, in children older than 6 years, respiratory tract infections, often attributed to Mycoplasma pneumoniae, are more frequent, with headache and dizziness emerging as the more characteristic symptoms [14].

Moreover, MERS has been documented in infants, especially in connection with respiratory syncytial virus (RSV) infections, underscoring the vulnerability of very young children to this condition [15].

In general, although MERS can affect individuals of different age groups, it is most commonly seen in children, especially those younger than 10 years old [14,16].

Management

The management of MERS in pediatric patients primarily focuses on supportive care, as the condition typically resolves spontaneously with a favorable prognosis. Since viral infections are the most common cause, treatment is generally directed at the underlying etiology and symptom severity.

Supportive care

- **Hydration and Electrolyte Balance:** Maintaining adequate hydration and correcting electrolyte imbalances, such as hyponatremia, is essential.
- **Symptomatic Management:** Fever can be managed with antipyretics, while seizures—if present—are usually transient and may require short-term anticonvulsant therapy.

Specific treatments

- **Antiviral Therapy:** Considered when a specific viral pathogen is identified.
- **Corticosteroids:** Used in select cases with significant inflammation or severe symptoms, though routine use remains controversial.
- **Intravenous Immunoglobulin (IVIG):** Administered in cases where an autoimmune or severe inflammatory response is suspected.

Prognosis

MERS has an excellent prognosis, with most pediatric patients achieving full recovery within a few weeks without long-term neurological complications [16-18].

Conclusion

This case highlights the clinical relevance of MERS, particularly in pediatric patients presenting with neurological symptoms following viral infections. The characteristic MRI findings serve as essential diagnostic markers, allowing for the distinction between MERS and other serious conditions. The case further emphasizes the importance of timely imaging and appropriate clinical interpretation to avoid unnecessary interventions. MERS is typically self-limiting, and effective management focuses on symptomatic relief and lifestyle modifications. As demonstrated in this patient, recognition and understanding of MERS can lead to positive outcomes and full recovery, reinforcing the necessity for clinicians to consider this syndrome in children presenting with neurological manifestations, particularly in the context of viral illnesses.

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