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CASE REPORT

Area Postrema Syndrome: A Rare Presentation of Neurosarcoidosis

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Abstract

This case report describes a rare occurrence of neurosarcoidosis presenting as area postrema syndrome, marked by severe nausea and vomiting. A woman in her 30s developed persistent symptoms following a cesarean section. Diagnostic investigations, including magnetic resonance imaging and cerebrospinal fluid analysis, confirmed the diagnosis of neurosarcoidosis. Treatment with prednisolone resulted in substantial symptom relief. This case emphasizes the need to consider neurosarcoidosis in the differential diagnosis of unexplained gastrointestinal symptoms and highlights the diagnostic challenges associated with such atypical presentations.

Keywords: Neurosarcoidosis, area postrema syndrome, granulomatous inflammation, cranial neuropathies, magnetic resonance imaging

Introduction

Neurosarcoidosis, a form of sarcoidosis involving the nervous system, occurs in 5-10% of sarcoidosis cases and presents with a range of neurological symptoms caused by granulomatous inflammation. It can involve various regions of the nervous system, including the meninges, brain, cranial nerves, spinal cord, and peripheral nerves, resulting in diverse clinical presentations (1). Among these, cranial neuropathy is the most common manifestation, affecting 50-70% of individuals with neurosarcoidosis, with the optic nerves being the most frequently involved (2).

The area postrema, situated on the dorsal surface of the medulla oblongata, plays a crucial role in regulating the vomiting reflex. Involvement of this structure in neurosarcoidosis can result in a rare clinical entity known as area postrema syndrome, characterized by persistent nausea and vomiting (3). Given its rarity, this manifestation necessitates heightened clinical awareness and comprehensive evaluation in patients with unexplained nausea and vomiting, as it presents notable diagnostic challenges (4).

This case report highlights the uncommon presentation of area postrema syndrome within the neurosarcoidosis spectrum, emphasizing its consideration in the differential diagnosis of refractory nausea and vomiting.

Case Report

A woman in her 30s presented to our clinic with persistent nausea, vomiting, and fatigue that had persisted for 3 years. These symptoms began following a cesarean section and were marked by intermittent exacerbations without complete resolution. One year prior to her visit, she experienced a single episode of status epilepticus. During her admission to intensive care, magnetic resonance imaging (MRI) revealed hyperintensity in the right and left medial temporal lobes (Figure 1), raising suspicion for encephalitis. Cerebrospinal fluid (CSF) analysis at the time showed elevated protein levels at 244 mg/dL, with no other abnormalities or malignant cells detected.

On examination in our clinic, the patient appeared frail but was alert, cooperative, and oriented. Neurological assessment revealed horizontal and vertical nystagmus, while other cranial nerve functions remained intact. Muscle strength was preserved; however, she was unable to walk unassisted due to severe ataxia. Deep tendon reflexes were significantly brisk, with positive clonus and bilateral extensor plantar responses. MRI showed mild hyperintense lesions in the brainstem, right medial temporal lobe, and right cerebellum, indicative of neuroinflammatory processes. Post-contrast imaging revealed symmetric nodular-subpial enhancement along the cervical spinal cord, as well as involvement of the supratentorial meninges, brainstem, and cerebellum. These findings, consistent

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with neurosarcoidosis, reflect granulomatous inflammation (Figure 2).

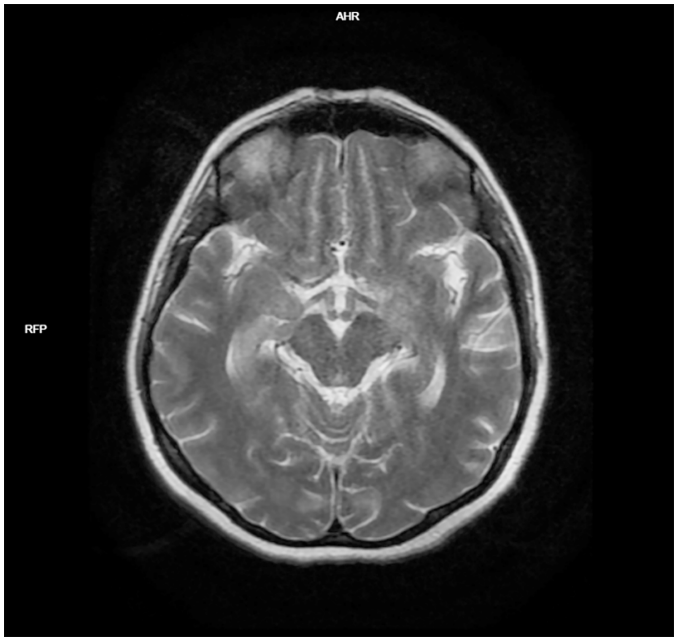

Figure 1. Axial T2-weighted MRI taken with a 1.5-T scanner, showing hyperintensity in the right and left medial temporal lobes, consistent with neurosarcoidosis

MRI: Magnetic resonance imaging

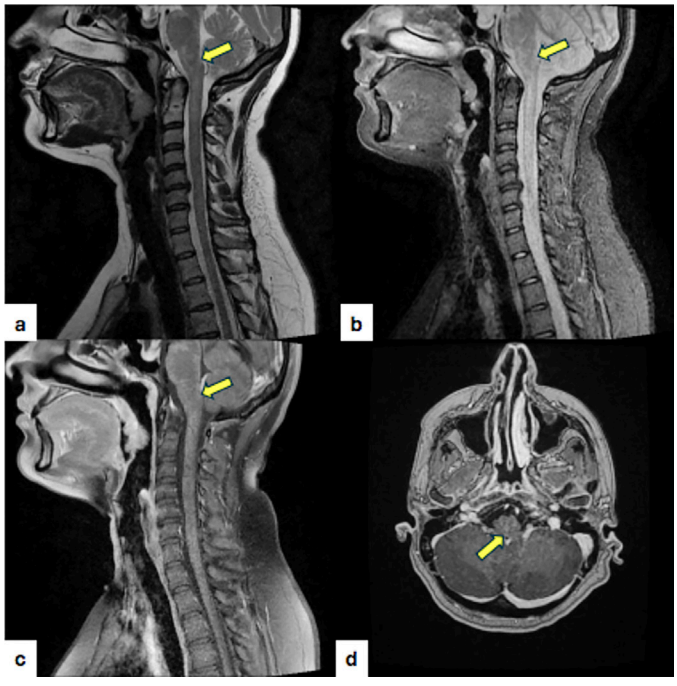

Figure 2. Sagittal T2 (a), short tau inversion recovery (b), post-contrast sagittal T1 (c), and axial T1 (d) MRI obtained with a 1.5-T scanner. These images reveal symmetric nodular-subpial enhancement along the cervical spine, as well as supratentorial meningeal and brainstem-cerebellum involvement, typical of neurosarcoidosis

MRI: Magnetic resonance imaging

Serum angiotensin-converting enzyme (ACE) levels were elevated at 82 U/L (normal range, 8-52 U/L), and 24-h urinary calcium was also increased. Repeat CSF analysis revealed a protein level of 177 mg/dL, with no cellular abnormalities. Tests for oligoclonal bands, serum NMO-IgG, and anti-MOG antibodies were negative, as was the autoimmune encephalitis panel. Chest computed tomography (CT) identified multiple lymphadenopathies in the mediastinal, subcarinal, bilateral hilar, and intrapulmonary regions, with the largest measuring 16 mm. Additionally, parenchymal nodules with a perilymphatic distribution, a hallmark of systemic sarcoidosis, were observed. These systemic findings, combined with the neurological features, supported the diagnosis of neurosarcoidosis (Figure 3). The differential diagnosis initially considered other potential causes, including encephalitis and demyelinating diseases such as multiple sclerosis and neuromyelitis optica spectrum disorder (NMOSD). The diagnosis of neurosarcoidosis was strongly supported by the presence of systemic sarcoidosis features, such as lymphadenopathy and parenchymal nodules on chest CT, contrast-enhanced MRI findings, and elevated ACE levels. A lymph node biopsy confirmed the diagnosis. Treatment began with prednisone at 1 mg/kg daily, in coordination with the pulmonology team to address both neurosarcoidosis and systemic sarcoidosis. Later, mycophenolate mofetil (2 × 1000 mg daily) was added. Significant improvement was noted within a week of prednisone treatment, with marked reduction in nausea and vomiting and improved ataxia, enabling the patient to walk with support. She remains under close follow-up for treatment response and medication adjustments (Figure 4).

Discussion

Sarcoidosis, an immune-mediated disease characterized by granulomatous inflammation, can affect multiple systems, with the lungs, skin, eyes, liver, lymph nodes, and nervous system being commonly involved in 5-10% of cases. Neurosarcoidosis can lead to significant morbidity and has been identified in up to 25% of patients upon autopsy, suggesting it may be underdiagnosed during life (1,2,4). The nervous system can be affected at various sites, with common central nervous system (CNS) involvement including the hypothalamus/optic chiasm and meninges. Cranial nerve involvement, especially of the facial and optic nerves, is frequent. However, area postrema involvement has not been previously reported in the neurosarcoidosis literature (5). Diagnosing sarcoidosis typically requires clinical and radiological evidence, non-caseating granulomas, and the exclusion of other conditions. A thorough evaluation for systemic involvement is essential, as illustrated by the resolution of our case with corticosteroid treatment and close follow-up.

This case report highlights area postrema syndrome as a rare and significant presentation in the context of neurosarcoidosis.

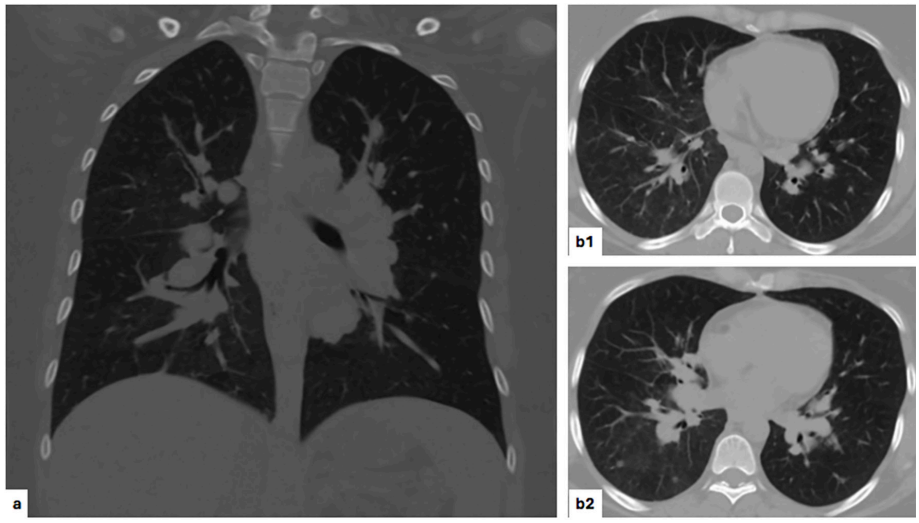

Figure 3. Coronal chest CT performed with high-resolution, thin-slice reconstructions, showing bilateral hilar and mediastinal lymphadenopathy, along with perilymphatic parenchymal nodules, consistent with systemic sarcoidosis [sagittal (a) and axial (b1, b2)]

CT: Computed tomography

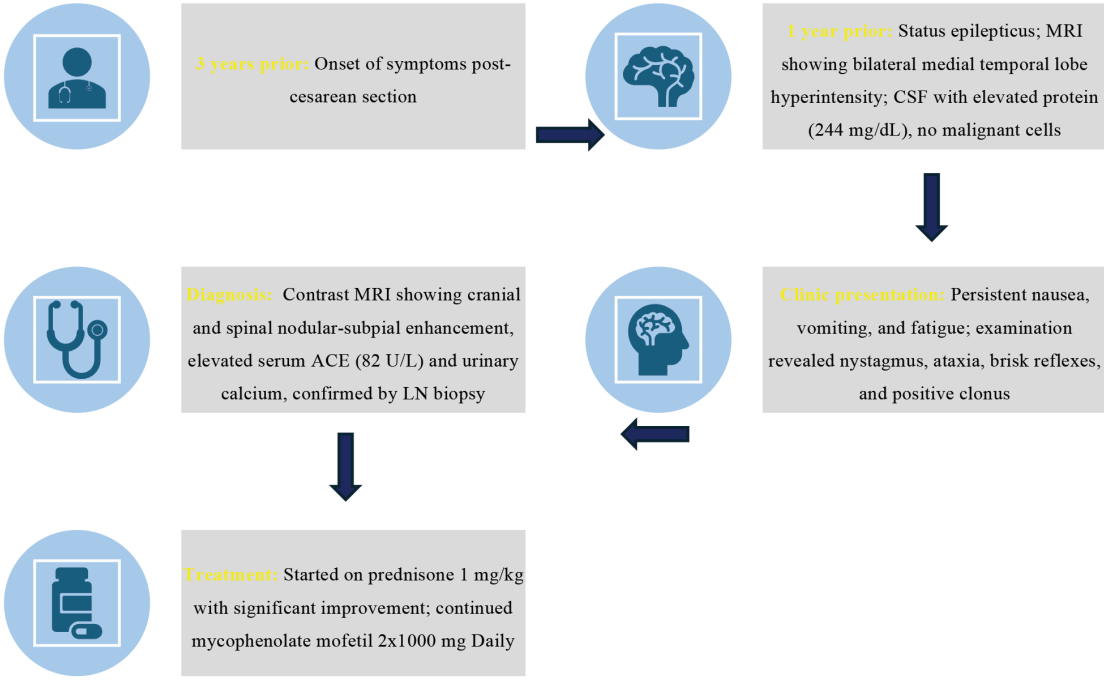

Figure 4. Neurosarcoidosis timeline. This figure provides a detailed timeline of the patient's clinical presentation, diagnostic findings, treatment interventions, and follow-up outcomes

MRI: Magnetic resonance imaging, ACE: Angiotensin-converting enzyme

The area postrema is known as a key "vomiting center", and its involvement in neuroinflammatory diseases is often associate with persistent nausea, vomiting, and hiccups.

Our findings are consistent with previous reports of neuroinflammatory diseases affecting the area postrema, such as NMOSD (1,5-7). However, this case represents an uncommon instance of neurosarcoidosis presenting with similar clinical features. MRI played a crucial role in our diagnosis, as its high sensitivity to inflammation and granulomatous changes allowed us to identify subtle but significant lesions in the brainstem and cervical spinal cord. These findings align with the those described by Stern et al. (4), emphasizing the value of advanced imaging techniques in diagnosing neurosarcoidosis. Furthermore, systemic imaging with chest CT confirmed typical sarcoidosis features, such as bilateral hilar lymphadenopathy and perilymphatic nodules. This multimodal imaging approach is essential for differentiating neurosarcoidosis from other

neuroinflammatory or demyelinating disorders (8). Recognizing area postrema syndrome in this context broadens the clinical spectrum of neurosarcoidosis and underscores the critical role of imaging in facilitating early diagnosis and treatment (9). Given the lack of randomized clinical trials in neurosarcoidosis, our findings also emphasize the importance of comprehensive diagnostic strategies that integrate both CNS and systemic evaluations.

Our case highlights the challenges of diagnosing and managing atypical presentations of neurosarcoidosis and underscores the importance of recognizing rare clinical syndromes such as area postrema syndrome. By incorporating advanced imaging techniques and systemic evaluations, we emphasize the value of a comprehensive diagnostic approach in identifying such complex cases. These findings call for increased clinical awareness and further research to improve diagnostic and therapeutic strategies in neurosarcoidosis, particularly in patients with persistent, unexplained gastrointestinal symptoms.

Ethics

Informed Consent: Informed consent was obtained.

Footnotes

Authorship Contributions

Surgical and Medical Practices: A.T., O.E., B.B., S.O., Concept: A.T., Design: A.T., Data Collection or Processing: A.T., O.E., B.B., S.O., Analysis or Interpretation: A.T., O.E., B.B., S.O., Literature Search: A.T., O.E., B.B., S.O., Writing: A.T., O.E., B.B., S.O.

Conflict of Interest: No conflict of interest was declared by the authors.

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