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## Multiple brain abscess in systemic lupus erythematosus patients



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### ABSTRACT

**Introduction:** Because SLE patients receive immunosuppressive and glucocorticoid medication, they are more susceptible to opportunistic infections. Multiple brain abscesses are an extremely uncommon side effect of systemic lupus erythematosus (SLE).

**Case description:** The purpose of this case study is to raise awareness of the 14-year-old girl who reported experiencing weakness in her limbs. A year ago, she received a diagnosis of systemic lupus erythematosus. Upon physical examination, nervus VII central paresis was discovered; the lower extremities' muscular strength was 3333/2222 and the upper extremities' 3333/2222. A head CT scan revealed findings that were consistent with lupus cerebritis. Multiple ring lesions with extensive edema were detected by magnetic resonance imaging, raising the possibility of multiple brain abscesses. For six weeks, the patient had intravenous metronidazole and ceftriaxone. The patient was allowed to go home with instructions to keep taking corticosteroids and mycophenolic acid as well as to schedule routine outpatient appointments. This case study aims to raise awareness about the 14-year-old girl who reported experiencing weakness in her limbs. Her condition was identified by specialists as systemic lupus erythematosus a year ago. Upon physical examination, nervus VII central paresis was discovered; the lower extremities' muscular strength was 3333/2222 and the upper extremities' 3333/2222. A head CT scan revealed findings that were consistent with lupus cerebritis. Multiple ring lesions with extensive edema were detected by magnetic resonance imaging, raising the possibility of multiple brain abscesses. For six weeks, the patient received metronidazole and ceftriaxone intravenously. We sent the patient home with instructions to keep taking mycophenolic acid and corticosteroids and to make routine outpatient appointments. This case study aims to raise awareness about the 14-year-old girl who reported experiencing weakness in her limbs. Her condition was identified by specialists as systemic lupus erythematosus a year ago. Upon physical examination, nervus VII central paresis was discovered; the lower extremities' muscular strength was 3333/2222 and the upper extremities' 3333/2222. A head CT scan revealed findings that were consistent with lupus cerebritis. Multiple ring lesions with extensive edema were detected by magnetic resonance imaging, raising the possibility of multiple brain abscesses. For six weeks, the patient received metronidazole and ceftriaxone intravenously. We sent the patient home with instructions to keep taking mycophenolic acid and corticosteroids and to make routine outpatient visits.

**Conclusion:** It is critical to being aware that individuals with impaired immune systems should always be suspected of having an opportunistic central nervous system infection when they experience new neurologic symptoms. A brain abscess is a chronic infection of the central nervous system that can arise from a number of risk factors and infection sources. A brain abscess is one of the uncommon side effects of SLE.

**Keywords:** multiple brain abscess, Systemic lupus erythematosus, weakness, nervus VII central paresis.

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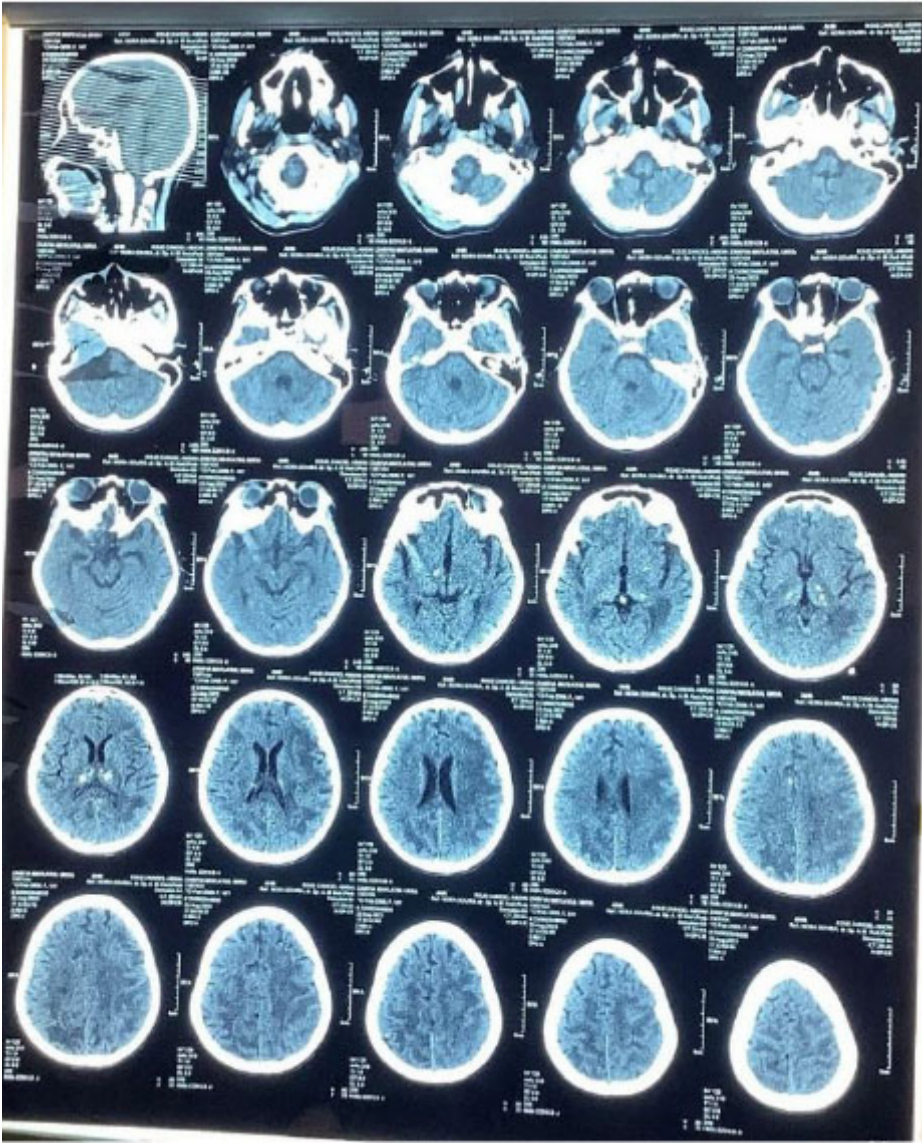
### INTRODUCTION

Brain abscess (BA) is an intraparenchymal infection that begins as a small area of cerebritis and develops into a mass of purulent material that has become encapsulated over time.<sup>1</sup> Brain abscesses grow throughout time in multiple phases. Early cerebritis, lasting 1-4 days, is characterized by a perivascular inflammatory response surrounding the necrotic site and white matter edema. Next comes the enlargement of the

necrotic center (late cerebritis, 4-10 days); fibroblasts and neovascularization gather peripherally to form a surrounding capsule (early capsule formation, 11-14 days), which tends to thicken with the addition of collagenous layers in the subsequent days (late capsule formation > 14 days).<sup>2</sup> Once developed, the abscess may cause immediate damage, infarction, or compression that leads to a lifelong neurological impairment.<sup>1</sup> The location and extent of the injured area, the degree

of surrounding edema, the pathogen's virulence, and its systemic diffusion all affect the signs and symptoms that children with brain abscesses experience.<sup>2</sup>

Entrance to an intensive care unit (ICU) is frequently required due to opportunistic central nervous system (CNS) infections, primarily due to changed mental status, convulsions, or other medical issues. Any new neurological symptoms in immunocompromised patients should always raise the possibility of an



**Figure 1.** Head CT Scan: multifocal hypodens area at cortical and subcortical cerebral, conclusion in line with lupus cerebritis.

opportunistic CNS infection.<sup>3</sup> Due to immunosuppressive and glucocorticoid medications, people with systemic lupus erythematosus (SLE) are more vulnerable to opportunistic infections, which frequently affect the skin, urinary system, and respiratory system. Multiple cerebral infections are not frequently recorded, nevertheless.<sup>4</sup> According to a single-center study conducted in 2019, pneumonia (20.5%), skin and soft tissue infections (20.5%), and urinary tract infections (41%), were the most common forms of infections among hospitalized SLE patients. A cerebral abscess-related first-time infection claimed the life of one SLE patient.<sup>5</sup>

Here, we describe a unique instance of SLE-related multiple brain abscesses. Patients need to receive metronidazole and other broad-spectrum antibiotics for six weeks. Treatment for lupus nephritis is ongoing, including corticosteroids and mycophenolic acid.

### CASE DESCRIPTION

A 14-year-old girl, who complained of weakness in her extremities, was brought to the emergency room. She was 16 days old at the time. The only movement made to the left extremities was horizontal. Only a modest lift was felt in the right extremities. She had her mouth twisted to the left while she mumbled incoherently.

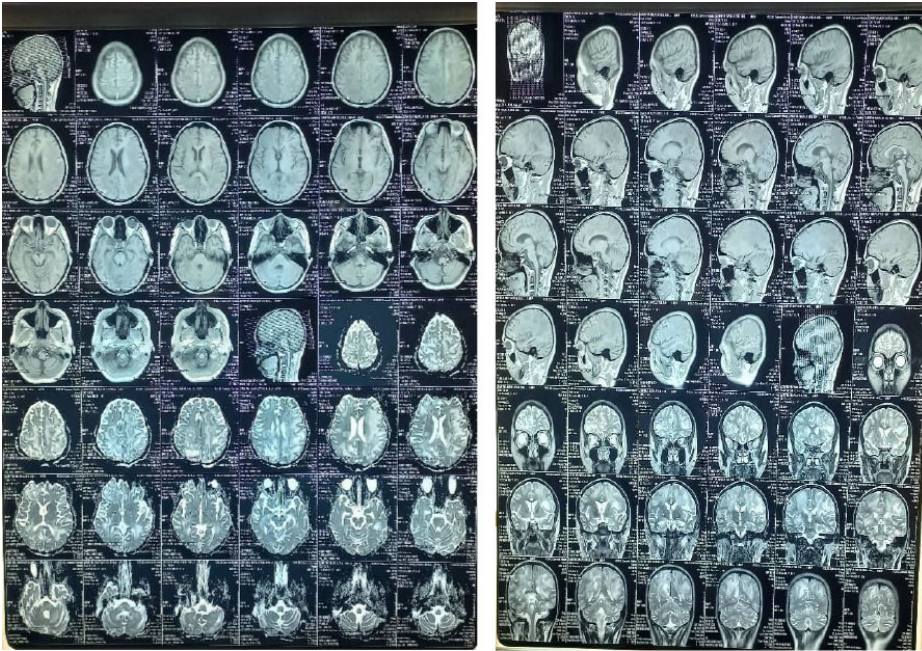
She managed to shut her eyes and fully flinch. There was no runny nose, cough, or fever. She frequently used bodily functions like eating, urinating, and defecating to indicate to her parents when she was in need. Helped by her mother, she managed to consume oatmeal. A physical examination indicated nervus VII central paresis, with upper extremity muscle strength of 3333/2222 and lower extremity muscle strength of 3333/2222.

Past medical history: Three months prior, the patient was admitted to the hospital due to weakness in her left extremity. She was released from the hospital after making progress, but she was still unable to walk with her usual strength. At Dr. Zainoel Abidin Hospital, she received a lupus nephritis diagnosis a year ago, and she took five doses of cyclophosphamide. Medical history: The patient is currently taking 5 mg of lisinopril daily, 5 mg of Prednisone (2-2-1) three times a week (on Monday, Wednesday, and Friday), and 360 milligrams of mycophenolate sodium (Myfortic®) twice a day.

Anaemia, hypochrome microcytosis, thrombocytopenia, and anti-double stranded DNA antibody (anti-ds-DNA) 792,1 IU/mL were all observed during the laboratory evaluation. Figure 1 depicts a description consistent with lupus cerebritis based on head computed tomography. Numerous ring lesions with extensive edema were detected by magnetic resonance imaging at the left temporal lobe, parietal, occipital, and bilateral frontal lobes, suggesting the possibility of numerous brain abscesses (figure 2). After eight weeks in the hospital, the patient was released with instructions to continue taking mycophenolic acid, a corticosteroid, and to have frequent outpatient appointments.

### DISCUSSION

The location and extent of the affected area (table 1), the virulence and systemic diffusion of the pathogen, and the extension of the surrounding edema all influence the signs and symptoms that children with brain abscesses experience.<sup>2</sup> Headache is the most common symptom in older children (50%) although other symptoms include fever, changed mental status, nausea, vomiting, and



**Figure 2.** Wound condition at 2 days post operative.

photophobia. Seizures affect 30 to 50% of patients during admission. Six Neurological focal symptoms are rare and depend on the location of the abscess as well as its detrimental impact on the nearby eloquent cortex.<sup>2</sup> In this instance, the patient had facial nerve palsy and had complained of weakness in both upper and lower limbs for the week before to admission. The initial urgent imaging test is a computed tomography (CT), which is followed by a magnetic resonance imaging (MR) to further characterize the abscess and confirm the diagnosis.<sup>7,8</sup> A CT scan can be obtained quickly and is useful in elucidating the features of a suspected lesion. When a patient presents with Glasgow Coma Scale less than 10, focal neurological impairments, new-onset seizures, and a severely impaired state, it is frequently done prior to lumbar puncture. In the Felsenstein et al. study, magnetic resonance imaging (MR) is recommended as the gold standard for diagnosis because the BA was found in every patient whose MR was the initial imaging modality. They further urge using MR for follow-up.<sup>7</sup> In this instance, an MRI was conducted after the head CT scan, which served as the first imaging examination. Multifocal hypodense regions that fit the diagnosis of lupus cerebritis were observed during the initial evaluation. With a conclusion of suspected brain abscess, bilateral sinusitis

sphenoidal, right mastoiditis, and several lesions with broad edema in the bilateral frontal lobe, bilateral parietal, bilateral occipital, and left temporal, as well as the left cerebellum, were shown by the second modality.

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Third-generation cephalosporin combined with metronidazole for empiric therapy of community-acquired brain abscess in children and adults is strongly advised, per the guidelines set forth by the European Society of Clinical Microbiology and Infectious Diseases on diagnosis and treatment of brain abscess in children and adults. For six to eight weeks, the antibiotics are delivered. Corticosteroids are commonly used separately as supplementary treatment in patients with brain abscesses because they are useful in reducing oedema surrounding the lesions, mainly in the form of dexamethasone. Patients who have significant symptoms due to perifocal oedema or who are at danger of herniating are thought to benefit most from them.<sup>12,13</sup>

It was discovered that children with brain abscesses who had a Glasgow coma scale score of less than 12 or who had focal neurologic impairment (FND) at admission were at independent risk for poor neurological outcomes. The prognosis was not good for 14 patients who had FND at admission.

## CONCLUSION

It is imperative to remember that individuals with impaired immune systems who exhibit fresh neurological symptoms should constantly be checked for opportunistic central nervous

system infections. Patients with systemic lupus erythematosus are greatly vulnerable to opportunistic infections as a result of immunosuppressive and glucocorticoid therapy. Rarely are reports of several cerebral infections made.

## DISCLOSURES

### Consent for publication

The patient provided written, informed consent for the use of their images and this case report to be published.

### Funding

This study was conducted without any funding.

### Conflict of interest

There was no declared conflict of interest.

### Author contributions

In addition to providing patient care, SAK was involved in the manuscript's preparation and editing. JI took part in the manuscript supervision process. The final manuscript was read and approved by all writers.

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