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Case Report

From Confusion to Diplopia and Vertigo: Suspected Central Nervous System Infections Following Obinutuzumab in Systemic Lupus Erythematosus: A Case Report of Two Patients

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Abstract

Obinutuzumab, a type II anti-CD20 monoclonal antibody, causes prolonged B-cell depletion and is increasingly used in systemic lupus erythematosus (SLE) and lupus nephritis. Central nervous system (CNS) infection is a concern and is hard to distinguish from neuropsychiatric lupus. We report two women with SLE and lupus nephritis who developed neurological symptoms about five weeks after obinutuzumab. A 42-year-old woman presented with confusion, headache and fever; imaging suggested frontal and occipital pyogenic abscesses with midline shift. A 29-year-old woman presented with headache, diplopia and vertigo; MRI showed multiple brainstem-predominant lesions, some ring-enhancing. Lumbar puncture was deferred in both because of mass effect or risk of coning, and no microbiological diagnosis was obtained; a brain biopsy in the second patient was non-diagnostic. Both improved with empirical antimicrobial therapy. New neurological symptoms during B-cell-depleting therapy warrant early neuroimaging and consideration of CNS infection. The temporal association does not establish causation.

Keywords: Lupus Erythematosus, Systemic, Lupus Nephritis, Obinutuzumab.

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Introduction

Systemic lupus erythematosus (SLE) is an autoimmune disease in which immune dysregulation can affect many organs. Lupus nephritis is one of its major manifestations, and when it does not respond to conventional therapy, intensive immunosuppression may be needed.[1] Obinutuzumab, a type II anti-CD20 monoclonal antibody, depletes B cells. It has emerged as a treatment option in SLE and lupus nephritis, particularly for patients who have responded inadequately to earlier therapies. However, the underlying disease and the accompanying immunosuppression can together raise the risk of serious infection.

Central nervous system (CNS) infection is especially hard to recognise in SLE, because its features overlap with neuropsychiatric lupus, cerebrovascular disease, vasculitis and treatment-related complications. Patients may present with headache, altered mental status, focal neurological deficits, diplopia or vertigo. Diagnosis becomes harder still when intracranial mass lesions or raised intracranial pressure make lumbar puncture or tissue sampling unsafe.[2] We describe two patients with SLE and lupus nephritis who developed distinct neurological presentations about five weeks after receiving obinutuzumab. Their cases illustrate the diagnostic difficulties of suspected CNS infection in immunosuppressed patients.

Case Report

Case 1: Acute confusion with intracranial lesions

A 42-year-old woman with SLE and refractory lupus nephritis was on hydroxychloroquine, mycophenolate mofetil, tacrolimus and corticosteroids. She was also taking a direct oral anticoagulant for a deep vein thrombosis that was presumed to be due to antiphospholipid syndrome. She received obinutuzumab 1 g on day 1 and another 1 g on day 15.

Five weeks after the second dose, she developed several hours of acute confusion. This followed a moderate-to-severe diffuse headache and intermittent

high-grade fever. On assessment she was haemodynamically stable with a Glasgow Coma Scale score of 14/15. She had no focal neurological deficit and no signs of meningism.

Her initial tests were normal, including complete blood count, urinalysis, urine and blood cultures, serum electrolytes, blood sugar and procalcitonin. C-reactive protein was 7 mg/L. A non-contrast CT of the brain showed a right occipital space-occupying lesion with midline shift. Contrast-enhanced MRI and MR spectroscopy pointed to pyogenic abscesses in the frontal and occipital regions (Figure 1).

Lumbar puncture and tissue sampling were deferred because of the intracranial lesions, the mass effect and the bleeding risk while she was anticoagulated. She was treated empirically with intravenous ceftriaxone and metronidazole, along with intravenous dexamethasone and mannitol. Cotrimoxazole was added later. She improved and was discharged. The available records do not show a definitive microbiological diagnosis.

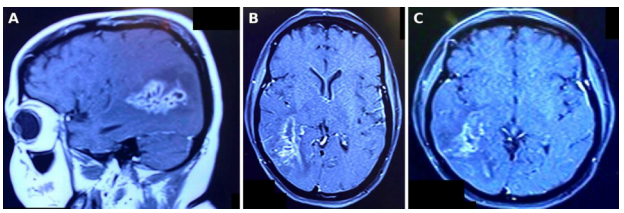


Figure 1: *Contrast-enhanced MRI of the brain of Patient 1.*

(A) Sagittal image and (B, C) axial images showing enhancing, ring-like lesions in the occipital region. Patient-identifying information has been removed from the images.

Case 2: Diplopia and vertigo with brainstem-predominant lesions

A 29-year-old woman with SLE and lupus nephritis that had not responded to cyclophosphamide or belimumab was given obinutuzumab. About five weeks later she developed a headache that lasted a week, followed by double vision and vertigo for four days. She felt feverish, but no fever was recorded.

On examination she had horizontal nystagmus. Routine blood tests were mostly unremarkable, apart from a mildly raised C-reactive protein. Procalcitonin was normal, complement levels were preserved, and anti-double-stranded DNA antibodies were negative on quantitative testing.

A non-contrast CT of the brain was normal. Contrast-enhanced MRI, however, showed multiple homogeneous lesions in both white and grey matter, mainly in the brainstem, with compression of the periventricular regions. A few lesions showed ring enhancement (Figure 2).

Lumbar puncture was deferred because of the risk of coning. She was started on empirical intravenous antibiotics, antituberculous therapy, cotrimoxazole and mannitol. A brain biopsy taken afterwards was non-diagnostic. She improved clinically, and her lupus nephritis remained in remission. The cause of the intracranial lesions was never confirmed.

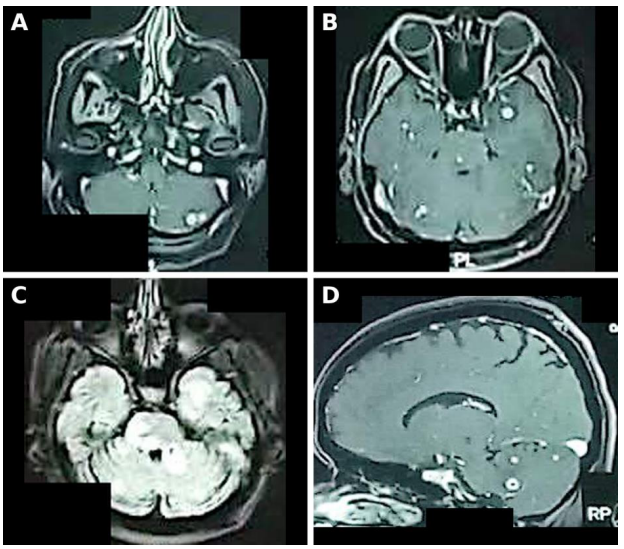


Figure 2: *MRI of the brain of Patient 2.*

(A, B) Axial post-contrast images showing multiple small enhancing foci; (C) axial FLAIR image through the posterior fossa; (D) sagittal post-contrast image. Patient-identifying information has been removed from the images.

Discussion

Our two patients, both with SLE and lupus nephritis on substantial immunosuppression, developed different neurological problems about five weeks after obinutuzumab. The first presented with acute confusion and imaging suggesting intracranial abscesses. The second had double vision and vertigo, with multiple lesions mostly in the brainstem. In a phase 3 trial, obinutuzumab added to standard therapy gave a better complete renal response than standard therapy alone in active lupus nephritis,[1] which supports its growing use and makes it important to recognise its complications.

The timing raises the possibility of CNS infection after B-cell-depleting treatment. However, we cannot separate the effect of obinutuzumab from that of SLE itself, the other immunosuppressants and each patient's individual circumstances. Neither case had a definitive microbiological diagnosis, so these should be read as suspected CNS infections, not as proven infections caused by obinutuzumab.

In SLE, the hardest part is telling infection apart from neuropsychiatric lupus and other neurological complications, particularly as CNS infection is uncommon in SLE but carries a high mortality.[2] Brain abscess has been described during immunosuppressive therapy for lupus nephritis,[2] and nocardial brain abscesses mainly occur in immunosuppressed hosts, where their silent clinical picture can mimic lupus encephalopathy.[3] Headache, altered mental status, visual symptoms and vertigo are nonspecific, and infection, inflammation, vascular disease or drug effects can all cause them. Normal or only mildly abnormal routine blood tests and serology do not rule out serious CNS disease.

Imaging mattered a great deal here. In the first patient, CT showed an occipital space-occupying lesion with midline shift, and MRI went on to show abnormalities in the frontal and occipital regions. In the second, the CT was normal, yet contrast-enhanced MRI later revealed lesions in several areas. If suspicion stays high after a normal CT, MRI is worth doing. Confirming the diagnosis was limited by the risks of the procedures. In the first patient, the mass effect and anticoagulation led us to defer lumbar puncture and tissue sampling. In the second, we avoided lumbar puncture for fear of coning, and the brain biopsy that followed was non-diagnostic. Both patients improved on empirical treatment, which is reassuring, but it cannot tell us which organism was responsible or confirm that an infection was present. In published reports of brain abscess in SLE, such as those due to *Micrococcus luteus*[2] and *Nocardia*,[3] the organism was identified, which is the information we lacked.

These cases are a reminder to keep the differential broad and to assess new or worsening neurological symptoms promptly in patients on B-cell-depleting therapy. When sampling is unsafe, early neuroimaging, input from several specialties and timely empirical treatment may be necessary. Further investigation and follow-up are needed to clarify the underlying pathology and how best to treat it.

Conclusion

When a patient with SLE and lupus nephritis develops new neurological symptoms after obinutuzumab, CNS infection needs to be looked for urgently, alongside autoimmune, vascular and drug-related causes. Our two patients presented very differently, both had striking imaging findings, and in neither could we confirm the diagnosis microbiologically. Clinicians should keep a high index of suspicion for serious CNS disease, especially in patients on several immunosuppressive agents.

Ethical Approval: Informed consent for publication of clinical details was obtained from both patients.

Conflict of Interest: None

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Authors' Contribution

MH: Conception.
AS: Design of the work.
NMA, SF: Data acquisition, analysis, or interpretation.
MH, AS, SF: Draft the work.
NMA: Review critically for important intellectual content.
All authors approve the version to be published.
All authors agree to be accountable for all aspects of the work

References

1. Furie RA, Rovin BH, Garg JP, Santiago MB, Aroca-Martínez G, Zuta Santillán AE, et al. Efficacy and safety of obinutuzumab in active lupus nephritis. N Engl J Med. 2025;392(15):1471-83.
2. Erbasan F. Brain abscess caused by Micrococcus luteus in a patient with systemic lupus erythematosus: case-based review. Rheumatol Int. 2018;38(12):2323-8.
3. Li Z, Li D, Lv P, Liu J. Brain abscess due to Nocardia in a patient with systemic lupus erythematosus. J Rheumatol. 2022;49(4):432-3.