

# Unruptured Middle Cerebral Artery Aneurysm in a Patient with Systemic Lupus Erthematosus: A Diagnostic Challenge

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## Abstract

A 22-year-old female patient presented to the Emergency Department of a tertiary care hospital with symptoms of headache and nausea. She has been on a regular follow-up for the preceding three and a half years after being diagnosed as systemic lupus erythematosus (SLE). She had been treated earlier for SLE nephritis in the same institution, and had two relapses of nephrotic syndrome in the last three and a half years for which she had been treated and had achieved complete remission. All possibilities of headaches in background of SLE were considered. CNS examination was inconclusive. There was no nuchal rigidity or no cranial nerve deficits. Fundoscopy and Plain CT scan of brain were normal. The possibility of CNS-lupus was considered considering the high values of antiphospholipid antibodies (APLA). Treatment was initiated accordingly; however, there was no improvement in her symptoms. Although being rare in a patient with SLE, the possibility of an aneurysm was considered. Four vessel digital subtraction angiography revealed two unruptured aneurysms of 7.2 mm and 3.9 mm in the left middle cerebral artery (MCA) territory. Craniotomy and aneurysmal clipping was done successfully, and the patient was relieved of her symptoms. A high degree of suspicion towards a rarer cause clinched the diagnosis of a left MCA territory stem artery aneurysm. This rationale of strong suspicion and discussion of differential diagnosis brought a change in the management of the patient.

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## Introduction

Systemic lupus erythematosus is a multifactorial autoimmune disease of complex etiology, and may be associated with cognitive dysfunction, seizures and headaches.<sup>1</sup> Headaches in SLE patients have been attributed to vasculitis, which may be a part of SLE manifestation, and may present like migrainous headaches, tension headaches, psychological upsets or depression. Throbbing/Thunder clap headaches, headaches in patients with SLE are evaluated thoroughly for exclusion of cortical venous thrombosis and subarachnoid hemorrhage (SAH).

Headaches in SLE are significant because of diverse etiology. The SLE patients should be subjected to extensive evaluation with imaging and autoantibodies. Presence of antiphospholipid

antibodies and antiribosomal p antibodies are highly specific for neuropsychiatric manifestations of SLE.<sup>2,3</sup> Negativity of these antibodies does not exclude vascular events in a prolonged course of SLE. The most common manifestation of diffuse CNS lupus is cognitive dysfunction including difficulties with memory and reasoning. Headaches are also common. When excruciating, they often indicate SLE flare, and when milder, they are difficult to distinguish from migraine or tension headaches.<sup>4</sup> Small mycotic, berry aneurysms are known to occur in SLE, and may present with sudden rupture-SAH. Although the incidence of SAH ranges from 15.3% to 30% in autopsied SLE patients, true incidence of cerebral aneurysm associated with SLE is unknown. Aneurysm formation in SLE is thought to be a sequel of inflammation and necrosis of tunica media.<sup>5</sup> Subarachnoid hemorrhage in SLE secondary to rupture of these aneurysms is suspected, and proved by meticulous clinical examination, good imaging techniques and specific autoantibodies. Subarachnoid hemorrhage renders brain critically ill from both primary and secondary brain insults. Excluding head trauma, the most common cause of SAH is rupture of aneurysms. Aneurysms in the brain can undergo rupture and subsequent leaks of blood into the subarachnoid space; the so called sentinel bleed.<sup>6</sup> Herein the a case of lupus nephritis, in remission, presenting with headache is described.

### Case Description

A 22-year-old girl presented to the Outpatient Department (OPD) of a tertiary care hospital with complaints of headache and nausea for one week. She was a known case of SLE for the preceding three and a half years and was on a regular follow up. She had been treated earlier on two different occasions in the same institution for the relapse of nephrotic syndrome, and had achieved complete remission with 2 mg/kg mycophenolate mofetil (MMF) and 30 mg/kg prednisolone. Her renal biopsy done earlier was suggestive of focal segmental glomerulonephritis. On examination her blood pressure (BP) was 150/90 mmHg and pulse rate (PR) was 96 beats per minute (bpm). Clinical examination did not reveal signs of raised intracranial tension or neurological deficits, and her fundoscopic examination was normal.

She was admitted and thoroughly evaluated. Plain CT scan brain, lumbar puncture, echocardiography, and abdominal ultrasound with renal Doppler were normal. Antiphospholipid antibodies (APLA) values were significantly positive. The patient was treated with intravenous pulse methylprednisolone (1000 mg) therapy with and cyclophosphamide (2 mg/kg/day) for five days. Urine

protein and creatinine ratio was less than 1.5. Abdominal ultrasound with renal Doppler studies was done to exclude renal vascular pathology. The values of renal parameters helped us to make our thought clear of the possibility of any relapse of lupus nephritis. On the third day of her admission, she had severe headache. A high degree of suspicion of vascular aneurysm was kept in mind, and she underwent a four vessel angiography (figure 1), which revealed two culprit saccular aneurysms of 7.2 mm and 3.9 mm at the bifurcation of left middle cerebral artery (MCA). She was immediately referred to the Neurosurgery Department, where craniotomy and aneurysmal clipping were performed. This procedure of clipping both aneurysms was successfully done. The surgeons felt that the aneurysms were at the verge of rupture, and none of them could be resected for histopathological examination. These were presumed to be acquired aneurysms in the background of SLE. Postoperative follow up was uneventful, and she was discharged after two weeks of hospital stay. She has been on regular follow up with oral prednisolone (30 mg per day) and mycophenolate mofetil (2 g per day). She has remained free of symptoms free since then.



Figure 1: Digital subtraction angiogram showing two aneurysmal dilatations.

### Discussion

A high index of suspicion towards a rare cause clinched the diagnosis as the patient had developed left MCA territory aneurysms, diagnosed on four vessel digital subtraction angiography. Although the pathogenesis of aneurysms in SLE is still obscure, pathologic manifestations of SLE include various changes in medium-sized and small blood vessels, which contain many lesions at different stages of development.<sup>7</sup> These changes are encountered in almost all other organs and tissues.<sup>8</sup> Autopsy

findings support the theory that pathogenesis of cerebral aneurysms is acquired rather than congenital.<sup>9</sup> Similar cases of CNS lupus, associated with cerebral berry aneurysms has been reported.<sup>10</sup> Headaches in SLE patients should be distinguished clinically and evaluated with intricacy, keeping the possibilities of other causes of SLE headaches. The laboratory findings of autoantibodies support CNS involvement in SLE or excluding it. Vasculitis of the aneurysmal wall is interesting from the standpoint of the pathogenesis of cerebral aneurysm through vasculitic changes in blood vessel, which was noted in a very few cases of SLE.<sup>11,12</sup> This rare presentation of an unusual occurrence of unruptured MCA territory aneurysm as a co-morbid condition in a patient with SLE presenting with headache opens the corridors of thoughts towards the rare and more fatal conditions that can be associated in patients with SLE. A high grade suspicion made us to evaluate and treat this patient in a different perspective, and helped in preventing the ensuing devastating neurological catastrophe. It has to be kept in mind that SAH is a rare complication of SLE.<sup>13</sup> Subarachnoid hemorrhage in Asian patients (reportedly more in Japanese) is more frequent as compared to that in patients from Western countries, and can occur regardless of SLE disease activity.<sup>14</sup> The signs, symptoms and history of the present case indicate that clinicians must pay attention to the possibilities of rare presentations of aneurysms in patients with SLE.

**Conflict of Interest:** None declared.

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