



# Magnetic resonance imaging and magnetic resonance angiography in central nervous system systemic lupus erythematosus

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*The aim of the study was to evaluate MRI and MRA in CNS involvement of systemic lupus erythematosus (SLE). It was a retrospective study of 19 patients who were of 20-40 years of age and (17 F and 2 M) with clinical signs similar to migraine, with epilepsy or psychoses and with positive screening test for SLE. Antinuclear antibodies (ANA), anti-DNA antibodies, antiphospholipid antibodies were examined on MR imager Siemens Magnetom SP 63-4000 (1.5 T). Multiple small foci in subcortical and deep hemispheric white matter were revealed in 79.6% of patients. In 52.6% of patients we found large zones of cortical and subcortical edema. The combination of cortical and subcortical involvement was found in one third of patients. Inflammation and necrosis of the cerebral arteries may occur as a result of immuno-related processes. The MR angiographic results revealed several segments of reduced signal intensity in 63% of patients. MRI and MRA promised to be a unique and powerful tool for the clinical investigation of CNS involvement in SLE.*

**KEY WORDS:** Lupus Erythematosus, Systemic; Magnetic Resonance Angiography; Magnetic Resonance Imaging; Central Nervous System Diseases

*Archive of Oncology 2001,9(1):27-28©2001, Institute of Oncology Sremska Kamenica, Yugoslavia*

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## INTRODUCTION

A variety of causes of cerebral vasculopathy (previously called vasculitis) are known, such as bacterial arteritis, tuberculous arteritis, yeast and fungal arteritis, meningovascular syphilis, necrotizing angiitis, periarteritis nodosa, collagen disorders, viral arteritis, radiation arteritis, chemical arteritis, cysticercosis, and others. Systemic lupus erythematosus (SLE) is among relatively common diseases and may result in a cerebritis-vasculopathy (vasculitis) involving multiple intracerebral vessels. Approximately 7% of SLE patients have neuropathological evidence of cerebral vasculitis. (1,2). Moreover, this disease occurs in young adults and can produce a neurological picture similar to that of MS. The aim of the study was to evaluate MRI and MRA in CNS involvement of systemic lupus erythematosus (SLE).

## MATERIALS AND METHODS

It was a retrospective study of 19 patients with clinical signs sim-

ilar to migraine, with epilepsy or psychoses and with positive screening test for SLE (antinuclear antibodies (ANA), anti-DNA antibodies, antiphospholipid antibody were examined on MR imager Siemens Magnetom SP 63-4000 (1.5 T). The protocol was T1W axial, coronal plain and T2W/PD axial plain of endocranium and 3DTOF MR angiography with parameters MTTU3 FISP 3D\_64\_8 RB 81.UDB. TR 43 TE8 FA 20 MS 256x512, 1aqv.

## RESULTS

Patients were from 20-40 years of age with female-male ratio 17:2. Multiple small foci in subcortical and deep hemispheric white matter were revealed in 79.6% of examined patients, 52.6% patients had large zones of cortical and subcortical edema. The combination of cortical and subcortical involvement was found in one third of patients. The MR angiographic results revealed several segments of reduced signal intensity in 63% of cases.

## DISCUSSION

White matter lesions may be the primary MR finding in many disease processes. The differentiation between systemic lupus erythematosus (SLE) and MS may be particularly difficult both clinically and on MRI (1,2,3). Associated systemic features are important diagnostic clues for vasculitis and the brain images usually

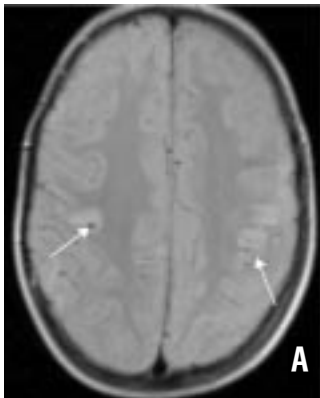
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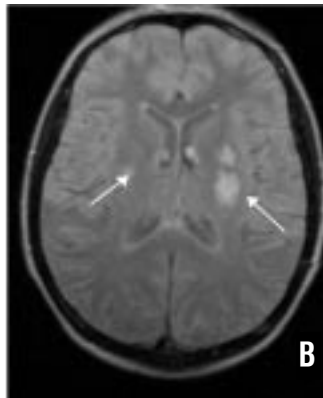
The manuscript was received: 27. 02. 2001.

Provisionally accepted: 28. 02. 2001.

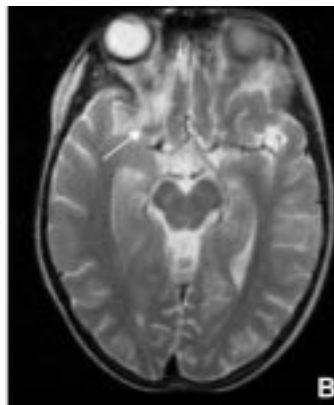
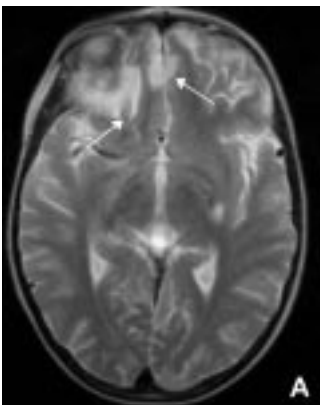
Accepted for publication: 02. 03. 2001.



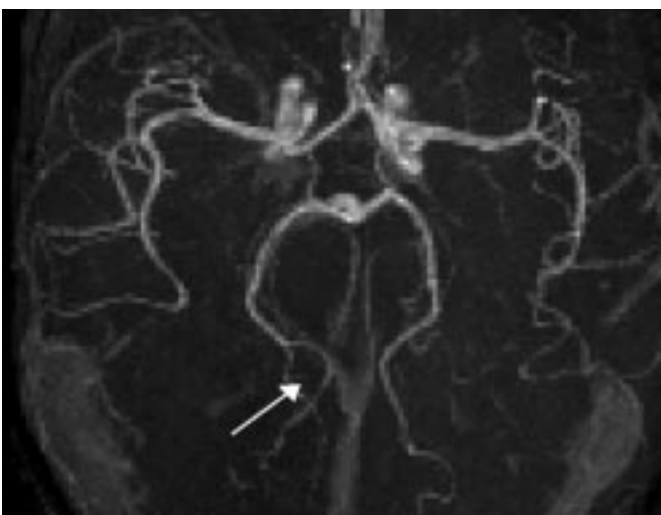
**Figure 1A.** PD axial planes reveal areas of increased signal intensity



**Figure 1B.** FLAIR axial image with areas of hyperintensity in basal ganglia



**Figure 2.** Cerebral arteritis in a 25-year old woman with SLE A and B axial T2W image revealed multiple areas hyperintense subcortical white matter, and a lower section also revealed areas of hyperintensity



**Figure 3.** The cerebral MR angiography reveals multiple sausage-shaped areas with long areas of narrowing and widening secondary to vasculopathy

reveal cortical infarcts in addition to the periventricular lesions. The most common lesion that may mimic the demyelinating or dysmyelinating disorders of small vessel ischemic disease is in the periventricular location. Cortical infarctions (infarctions) are certainly more typical of SLE than MS, but in most cases they are not, in fact, easily distinguished. Areas of arteritis appear similar

to other ischemic lesions, except that foci of arteritis tend to be more patchy, bilateral and widespread than with other ischemic processes (3). The areas of increased intensity seen with lupus cerebritis are thought to be secondary to a vasculitis that has resulted in multiple tiny areas of infarction. The abnormal areas of increased signal intensity in patients with lupus cerebritis may be visualized on the MR scan even when the CT scan is normal. Angiography is necessary for complete evaluation. Magnetic resonance angiography (MRA) may one day replace standard angiography for the diagnosis of vasculitis. It results in a typical angiography appearance of sausage-shaped areas of widening and narrowing of the vessels; these abnormal vessels may result in areas of infarction (4). Inflammation and necrosis of the cerebral arteries may occur as a result of immuno-related processes. It can exist (excite) areas of extensive calcification in patients with lupus cerebritis.

## CONCLUSION

Both CT and MRI studies can detect parenchymal changes secondary to vasculitis. MRI studies however are certainly more sensitive than CT scan. MRI and MRA promise to be a unique and powerful tool for the clinical investigation of CNS involvement in SLE.

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