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Case report

Intracranial hypertension with reversible cerebral edema: Atypical presentation of neuropsychiatric systemic lupus erythematosus [☆]

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ABSTRACT

We described in this article a 19-year-old girl with an intracranial hypertension as an initial presentation of neuropsychiatric lupus. The brain MRI showed diffuse, bilateral and symmetrical white and grey matter hyperintensities. These lesions completely disappeared after 3 months of treatment. Diffuse cerebral edema with or without leukoencephalopathy in neuropsychiatric systemic lupus erythematosus is an extremely rare entity.

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Introduction

Systemic Lupus Erythematosus (SLE) is an autoimmune disease characterized by the production of autoantibodies against cell nucleus giving rise to various clinical manifestations encompassing almost all the organ systems of the body. Neurological manifestations of SLE are grouped under the term of “neuropsychiatric systemic lupus erythematosus”. Nervous system involvement is frequently reported in 75% of patients with SLE and that varied from mild subtle signs

like headache and mood disturbance to life threatening conditions like acute confusional state, stroke and myelopathy [1]. Brain magnetic resonance imaging (MRI) is the exam of choice to assess damage to the central nervous system [2]. We report a case of neuro lupus with atypical images on brain MRI.

Case report

A 19-year-old female with a history of articular pain, presented to the emergency department complaining of multi-

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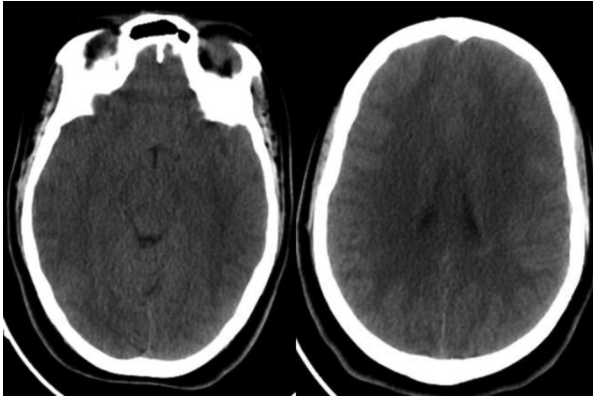


Fig. 1 – Brain CT scan showing diffuse white matter hypodensity.

ple episodes of headaches over the 2 past weeks. The cranial pain was initially of a moderate intensity, but it kept on worsening, becoming resistant to analgesics, and followed by horizontal diplopia. On physical examination, the patient was alert and oriented to time, place, and person. She had normal blood pressure (120/70 mm Hg), normal temperature (37,3°). The neurological examination was normal except for a paralysis of the right external oculomotor nerve. The skin examination found 3 erythematous pigmented spots on the nose and cheeks with the presence of pigmented spots on the dorsal side of the fingers and on the feet. These lesions were suspected of a discoid systemic lupus.

The ophthalmologic examination revealed a normal visual acuity with moderate bilateral papilledema. Brain CT scan showed diffuse white matter hypodensity (Fig. 1). Lumbar puncture (LP) revealed an elevated opening pressure of 280 mm H₂O. The cerebrospinal fluid analysis found a clear liquid, less than 3 white elements/mm³, normal glycorrhachia at 2.14 mmol/L, normal proteinorachia at 0.35 mg/L. Direct examination did not reveal any germs, the culture was sterile.

Brain MRI was performed as part of the etiological assessment and revealed bilateral and symmetrical diffuse white matter and basal ganglia T2 and FLAIR hypersignal sparing the cortex (Fig. 2).

Laboratory results showed an anemia at 10.8 mg/dl and a normal white blood cell count. Inflammatory markers C-reactive protein was negative (3 mL/l). However, the erythrocyte sedimentation rate was elevated (50 mm/h). Protein electrophoresis showed a hypoalbuminemia associated with an increase in alpha 1, alpha 2 and gamma globulins. Blood glucose, kidney and liver function tests were normal. Human Immunodeficiency Virus serology was negative. Antinuclear antibodies were positive (titer: 1/640). The test for anti-phospholipid antibodies (IgG) was negative. According to the ACR 1997 criteria [3], the diagnosis of SLE was retained. It was revealed by intracranial hypertension and diffuse bilateral MRI abnormalities. The treatment was based on pulse intravenous methylprednisolone (1 g/d) for 5 days then we continued by oral prednisone 1 mg/kg/d, associated with Hydroxychloroquine 400 mg/d, and Rituximab (500 mg every 6 months). The patient was also treated for her intracranial

hypertension syndrome using Acetazolamide (750 mg/d) and therapeutic LP. The evolution was marked by an improvement of symptoms and disappearance of lesions on the MRI after 03 month of treatment (Fig. 3).

Discussion

The neurological events in systemic lupus erythematosus are polymorphic and often associated with an unfavorable prognosis. Thus, neurolupus can mimic all types of neurological and psychiatric attacks, and can even occur in the absence of any systemic sign of the disease [4].

Brain MRI is currently the anatomic imaging modality of choice to assess damage to the central nervous system, the lesions usually encountered in neuropsychiatric lupus are hyper intense T2 punctuate or nodular lesions in the white matter in frontal and parietal lobes. The grey matter can be involved during the active phase of the disease and sometimes it cannot be identified with the conventional MRI. However, brain MRI can be normal despite the presence of neuropsychiatric signs in 19%-46% of cases [2]. Some clinic-radiological presentations are rare and sometimes atypical.

We describe in this article a patient with an intracranial hypertension as an initial presentation of neuropsychiatric lupus with diffuse reversible white and grey matter lesions on imaging. According to the literature, the finding of diffuse cerebral edema with or without leukoencephalopathy in NPSLE is extremely rare, and if present, develops later in the disease course and typically with other systemic signs of the disease.

There have been 8 cases reported of diffuse cerebral edema with intracranial hypertension: 5 patients had a history of lupus before the onset of neurological symptoms, they all had diffuse hyper intense white matter lesions on FLAIR suggestive of leukoencephalopathy. A favorable outcome was noted in 4 cases [5,7,9,10]. However, 4 patients died due to malignant diffuse vasogenic edema [6,8,11]. Postmortem examination of some of the cases, revealed diffuse cerebral edema characterized by extensive perivascular pale eosinophilic fluid in the white matter, and nonspecific perivascular lymphocytic infiltration. There were no pathologic findings consistent with the diagnosis of vasculitis [6].

The pathophysiology has been discussed in SLE cases of idiopathic intracranial hypertension with diffuse cerebral edema. There are multiple theories, including the possibility of immune-complex mediated damage, autoantibodies interacting (either directly or indirectly) with antigens on neuronal cell membrane, intrathecal cytokine production, and microangiopathy [11].

The additional particularity of our case is the involvement of the grey matter: thalami and lenticular nucleus. There has been only 1 case of grey mater involvement in a neuropsychiatric SLE, an 11-year-old Japanese girl who presented with a malar erythematous rash with photosensitivity and prolonged low-grade fever. She was diagnosed with SLE and started on intravenous prednisolone. A few days later, the patient developed generalized convulsions followed by prolonged unconsciousness. The MRI showed high signal

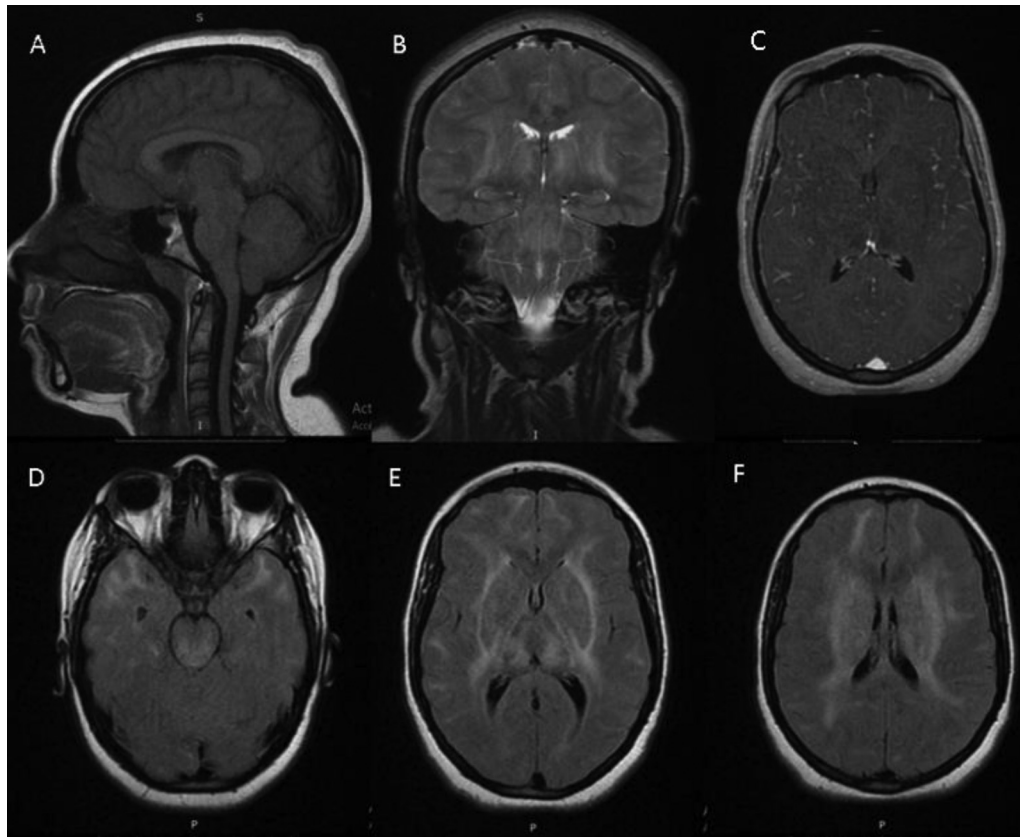


Fig. 2 – Brain MRI: Sagittal T1 (A). Coronal T2 (B). Gadolinium enhanced axial image (C). Axial FLAIR images (D, E, F) showing diffuse white matter T2 and FLAIR hypersignal involving U fibers in the temporal, fronto-parietal and occipital regions. The internal capsules, external capsules, centrum semi-ovale, upper and middle cerebellar peduncles, pons, thalami and striatum were involved bilaterally and symmetrically. There was no gadolinium enhancement.

intensity in the deep white matter, pons, thalami and bilateral basal ganglia on T2-weighted image. The lumbar puncture was normal. Ophthalmoscopic examination showed a central retinal artery occlusion in the left eye in addition to bilateral SLE retinopathies. Because of progressive retinal lesions and a skin rash, intravenous methylprednisolone (500 mg/d for 3 days) was started. She made a full recovery in motor ability within 1 month and in mental ability over 3 months [12].

Due to its possible association with SLE, the reversible nature of the MRI abnormalities, and grey matter involvement, we have discussed the diagnosis of Posterior reversible encephalopathy syndrome (PRES) for our patient. A literature review showed that severe hypertension (>170/110 mm Hg), renal failure and immunosuppressive drugs were present in the majority of previously reported cases of SLE with PRES [13].

What was not in favor of the diagnosis of PRES in the context of an NPSLE is that our patient presented neither arterial hypertension, nor renal insufficiency, and was not yet under any disease-modifying treatment. Moreover, the absence of cortical lesions, and the very symmetrical nature of the lesions on brain MRI were also against this diagnosis.

Idiopathic intracranial hypertension (IIH) is an uncommon syndrome of neuropsychiatric SLE and 1 of the causes of

headache in SLE. It is defined by an increased intracranial pressure without hydrocephalus or lesions on the MRI or CT and with normal CSF composition. IIH has been reported in a few sporadic cases in adult patients with SLE, sometimes as an initial presentation of SLE [14].

The pathogenetic mechanism of IIH in SLE is not yet fully understood. Immune-mediated injury within the arachnoid villi and the resultant decrease in CSF absorption and/or thrombotic obliteration of cerebral arteriolar and venous systems due to a hypercoagulable state are among the most probable mechanisms [15,16]. SLE-associated IIH usually indicates a favorable outcome. The treatment is based on corticosteroid; Acetazolamide, intravenous mannitol and furosemide are used to reduce the intracranial tension. In addition, plasmapheresis, azathioprine, cyclophosphamide and other immunosuppressive agents can also be used [17].

IIH was not the case in our patient because of the MRI abnormalities. Therefore, we can conclude that it is a diffuse cerebral edema affecting both the white and grey matter, manifested by intracranial hypertension, revealing an SLE, and having evolved very well under treatment with complete disappearance of the lesions on the MRI.

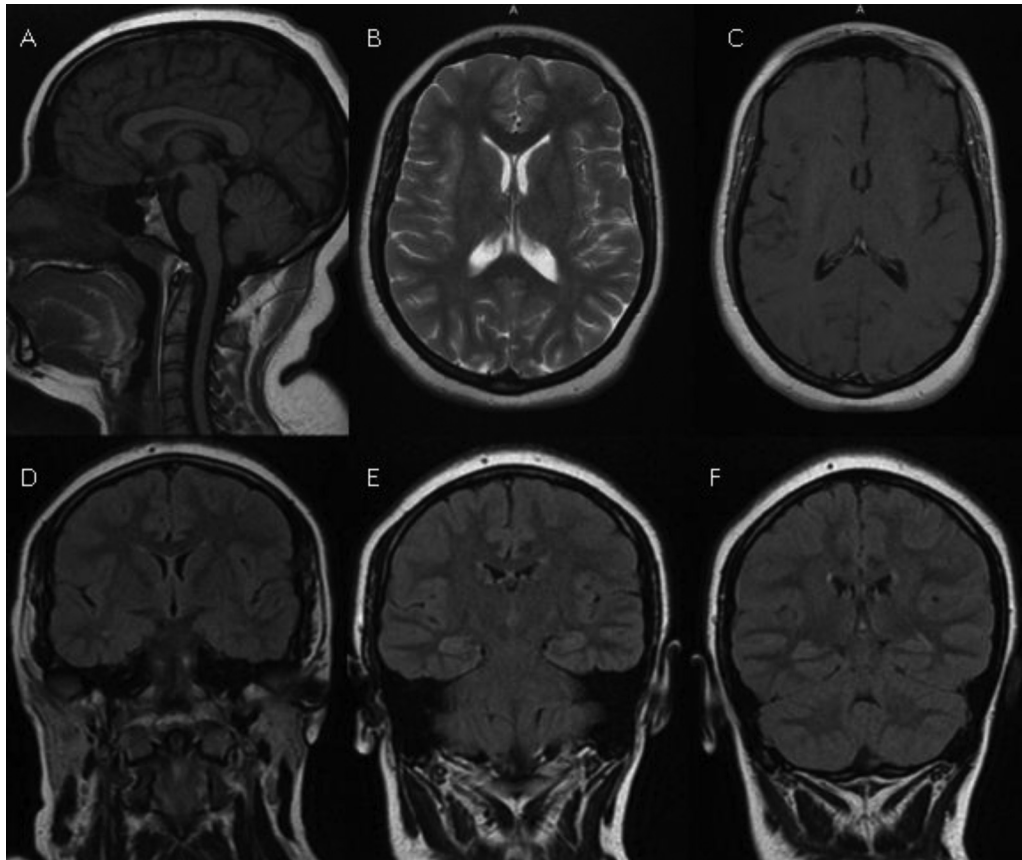


Fig. 3 – Brain MRI: sagittal T1 (A), axial T2 (B), gadolinium enhanced axial image (C), coronal FLAIR images (D, E, F) showing a complete regression of the previous abnormalities after 3 mo of treatment.

Conclusion

Reversible diffuse cerebral edema with intracranial hypertension is an extremely rare entity in NPSLE. It can reveal the disease, and it can have a relatively good prognosis despite the extent of the lesions on the MRI.

Patient consent

Our patient give permission to use her clinical information/video/photographic material in the publication.

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