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REPORTE DE CASO

Early neurological disorder as a clinical presentation of systemic lupus erythematous with cerebral vasculitis, a rare form to debut

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Presentación clínica inicial con compromiso neurológico del lupus eritematoso sistémico; reporte de un caso clínico con vasculitis cerebral, una forma poco común de debutar / Apresentação clínica inicial com envolvimento neurológico de lúpus eritematoso sistêmico; relato de caso clínico com vasculite cerebral, uma apresentação rara

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ABSTRACT

We present a case of a 27-year-old female patient with no past medical history of autoimmune disease, consulting for extremities weakness, hallucinations, and arthralgia, which started two weeks before. Decreased limbs strength and hallucinations were evidenced during the physical exam. The patient's laboratory results showed a systemic inflammatory response with high ANA, low complement levels, and radiological evidence of vasculitis in cerebral arteries of medium and low caliber; as a result, treatment for Systemic Lupus Erythematous was started. Additionally, invasive mechanical ventilation was necessary due to respiratory failure with pleural and pericardial effusion. Finally, treatment produced positive results, as the patient was discharged without any neurological, respiratory or systemic signs and symptoms.

Keywords: Systemic lupus erythematous; Vasculitis; Neurological disorder.

RESUMEN

Presentamos el caso de una paciente femenina de 27 años de edad que consulta por debilidad en miembros, alucinaciones, y artralgias de dos semanas de evolución, sin antecedentes medicos positivos o de enfermedad auto-inmune. Se encontró disminución de la fuerza muscular en miembros al examen físico al igual que manifestaciones visuales de la paciente correspondientes a alucinaciones. Sus resultados de laboratorio mostraron una respuesta inflamatoria sistémica con altos niveles de ANAs, complemento bajo, y evidencia radiológica de vasculitis en arterias cerebrales de pequeño y mediano calibre. Como resultado de lo anterior, se inició manejo para Lupus Eritematoso Sistémico. Sin embargo, fue necesario ventilación mecánica invasiva debido a fallo respiratorio con derrame plural y pericárdico. Finalmente, los resultados del tratamiento fueron positivos con el alta del paciente sin signos o síntomas neurológicos, respiratorios, o alguna secuela.

Palabras clave: Lupus eritematoso sistemico; Vasculitis; Compromiso neurológico.

RESUMO

Apresentamos o caso de uma paciente de 27 anos que apresentou fraqueza nos membros, alucinações e artralgia com duração de duas semanas, sem histórico médico positivo ou doença autoimune. O exame físico revelou diminuição da força muscular nos membros, bem como manifestações visuais correspondentes a alucinações. Os resultados laboratoriais mostraram uma resposta inflamatória sistêmica com altos níveis de ANAs, baixo complemento e evidência radiológica de vasculite em artérias cerebrais de pequeno e médio calibre. Como resultado, o tratamento para Lúpus Eritematoso Sistêmico foi iniciado. No entanto, a ventilação mecânica invasiva foi necessária devido

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à insuficiência respiratória com derrames múltiplos e pericárdicos. Finalmente, os resultados do tratamento foram positivos e a paciente recebeu alta sem sinais ou sintomas neurológicos ou respiratórios, ou quaisquer sequelas.
Palavras-chave: lúpus sistêmicos; vasculite; envolvimento neurológico.

INTRODUCTION

Systemic lupus erythematous (SLE) is a multisystem autoimmune disease characterized by extensive reaction of antibodies against self-antigens, as well as a complement cascade activation. There are variety of ways in which this condition can clinically be presented.

SLE is most common among females between 15 and 44 years old, with a female-to-male ratio of 13:1; also, it is most prevalent among non-Caucasian females and three times more likely to cause morbidity and mortality among African Americans. Recently, the Centers for Disease Control and Prevention (CDC) reported a prevalence of 322,000 cases[1].

Although survival has increased drastically in the last 50 years, from less than 50% in the 1950's to close to 95% at the beginning of the 21st century, mortality remains two to four times higher in SLE patients when compared to healthy subjects[2].

A significant variety or organs and systems can be affected in SLE patients: skin, lungs, kidneys, joints, blood, central and peripheral nervous systems, and, skeletal muscle in 4-16% of cases[3].

Vasculitis occurs in 50% of SLE patients and it particularly affects the small and medium caliber vessels of a single or multiple organ (mesenteric, pulmonary, nervous system, skin, kidneys, and heart), this leading to multiple clinical manifestations depending on the organs and the caliber of the affected vessels[4,5].

Cerebral vasculitis is a rare event in patients with SLE, that is observed in less than 10% of post-mortem studies; such condition is a results of a damage in the vascular endothelium caused by activation of inflammatory mediators, inflammatory brain cells, cytokines infiltration, and self-antibodies through the blood brain barrier; this triggered cross-reaction with the cerebral antigens is known to produce cell death and neuropsychiatric manifestations in 15-75% of SLE patients; also, it is associated with a decreased quality of life, increased mortality and morbidity[6].

Reported in another study, the neurological and psychiatric manifestations have a prevalence of 14-95% and are more common in children; such variation is attributed to the different criteria used to classify clinical manifestations; nonetheless, neurological indicators may appear in the absence of active neurological disease and may appear as the symptom associated with SLE in 39-50% of cases (8). Finally, magnetic resonance imaging (MRI) is helpful for diagnosis due to it allows evaluate the cerebral parenchyma, as well as the vascular walls and lumen[7].

CLINICAL CASE

We present a case of a 27-year-old female patient, with a BMI of 17 (157 cm, 40.82 kg), consulting to emergency department due to progressive weakness in extremities, arthralgia, hallucinations (the patient reported seeing white curtains), altered mood, exertional dyspnea, decreased appetite, and slight shortness of breath, that had been evolving over the past two weeks. She denies experiencing nausea, vomiting, diarrhea, fever, chills, or chest pain, and has no history of alcohol, tobacco, or illegal substance intake. Additionally, she has no family history of autoimmune disease.

The patient reported testing positive for *Mycoplasma pneumoniae* ten days prior to her initial consult for the symptoms described previously. At the time, she received out-patient care with the suspicion of disease by *Mycoplasma*.

Physical exam

Patient reported tachycardic during the physical exam, with decreased muscle strength in legs (3/5) and arms (4/5), and tendinous reflexes of +2.

Diagnostic exams

The initial laboratory tests indicated homogeneous microcytic anemia with hypocalcemia as well as high erythrocyte sedimentation rate, creatinine kinase, creatinine kinase MB, troponin I, lactase dehydrogenase, AST, ALT and partial thromboplastin time. Low albumin and compensated respiratory alkalosis were also identified. Additionally, the urine analysis revealed erythrocytes and proteins, thus indicating the presence of nephritis (Table 1). A head tomography without contrast showed no pathological changes, as was the case with a thorax X-Ray. Finally, an EKG revealed a sinus tachycardia.

Based on above, an inflammatory process with possible systemic infectious was suspected; therefore, treatment with supplementary oxygen, intravenous fluids, gastric

antiacid, steroids, and empirical antibiotics were started. Nevertheless, laboratory and imaging studies were ordered upon suspicion of a vascular autoimmune disease.

Table 1. Remarkable admission laboratories.

Test	Result	Interpretation
Hb	8.9	Low
RBC	3.47	Low
Hct	26.1	Low
Plt	222	Normal
MCV	75.1	Low
MCH	25.6	Normal
MCHC	34	Normal
RDW	15.7	Normal
Calcium	7.9 mg/dL	Low
Creatine Kinase	2552 U/L	High
CK-MB	6.9 ng/ml	High
Troponin I high sensitivity	55.4 pg/ml	High
Lactate Dehydrogenase	1243 U/L	High
Albumin	3.1 gm/dL	Low
APTT	56.1 seconds	High
Ph	7.4	Normal
Pco2	27.1	Low
Po2	216.9	High
Hco3	16.4	Low
AST	238 U/L	High
ALT	64 U/L	High
ESR	125 mm/hr	High
Urinalysis		
Ph	6.0	Normal
Gravity	> 30 mg/dL	High
Glucose	Negative	Normal
Ketones	15 mg/dL	High
Blood	Moderate	High
Nitrate	Negative	Normal
Bilirrubin	Negative	Normal
Leukocyte Esterase	Negative	Normal
Urine Microscopic RBC	5-10	High
Urine WBC Clumps	Moderate	High
Cast	Present	High
Bacteria	Few	Abnormal

One day after admission, the patient was intubated due to respiratory failure and supported with mechanical ventilation at the intensive care unit. Posterior chest X-Rays taken after intubation exhibited bilateral pleural effusion and generalized pulmonary infiltrates (Figure 1).

The laboratory results, obtained on the 8th day after admission, revealed low complement levels and positive ANA (Table 2). Based on these, treatment was started with Cyclophosphamide and continued with Methylprednisolone and Enoxaparin.

Table 2. Other laboratories after admission.

Tests	Results	Interpretation
Hepatitis A IgG AB	Negative	Normal
Hepatitis B Surface Ag	Negative	Normal
Hepatitis B Surface AB	Positive	Normal
Hepatitis C IgG/M AB	Negative	Normal
C3 Complement	37 mg/dL	Low
C4 Complement	9 mg/dL	Low
Free T4	0.65 ng/dL	Low
ANA test	Homogeneus (+)	Abnormal
Anti ENA SM	> 8 Positive	Abnormal
Anti ENA RNP	> 8 Positive	Abnormal
Sjogren's AB SS-A Ro	3.4 Positive	Abnormal
Sjogren's AB SS-B La	< 0.02 Negative	Normal
Zika rRT PCR	Negative	Normal
Acetilcholine Receptor AB	< 0.3 Negative	Normal
SARS CoV-2 PCR	Negative	Normal
Herpes Simplex PCR at CSF	Negative	Normal
Aldolase	2.5 U/L	Normal
Double Stranded DNA	4 IU/mL	Normal
Cardiolipin IgG AB	10.8 U/mL	Normal
Cardiolipin IgM AB	10.5 U/mL	Normal
Anti Thyroid Peroxidase	0.32 IU/mL	Normal
Zinc Plasma	62 mcg/dL	Normal
P-ANCA IgG	< 0.2	Normal
C-ANCA IgG	< 0.2	Normal
Haptoglobin	65 mg/dL	Normal

Likewise, a chest tomography, taken 14 days after admission, presented evidence of bilateral pleural and pericardial effusion (Figure 2).

A brain MRI with and without contrast showed evidence of vasculitis in the cerebral arteries of small and medium caliber (Figure 3), thus explaining the initial clinical presentation.

Figure 1. Admission and after intubation chest X-Ray showing mild widespread interstitial infiltrates and blunting of the costophrenic angle (bilateral pleural effusion).

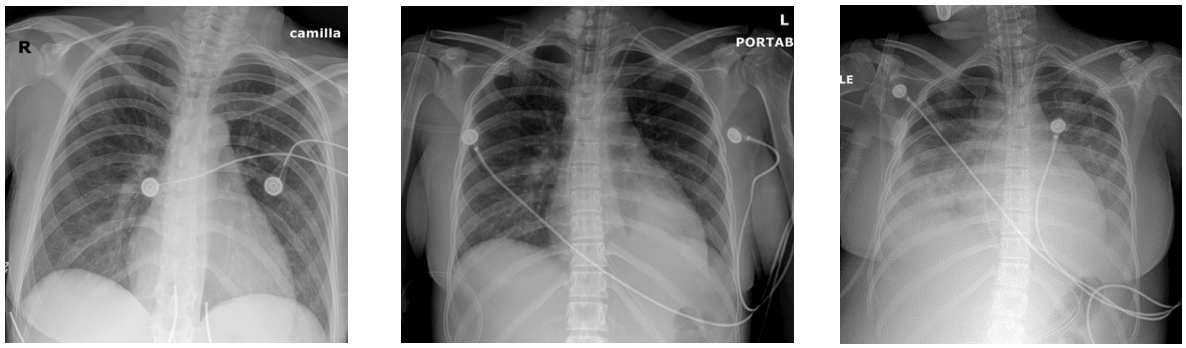


Figure 2. Chest CT showing pericardial and pleural effusion.

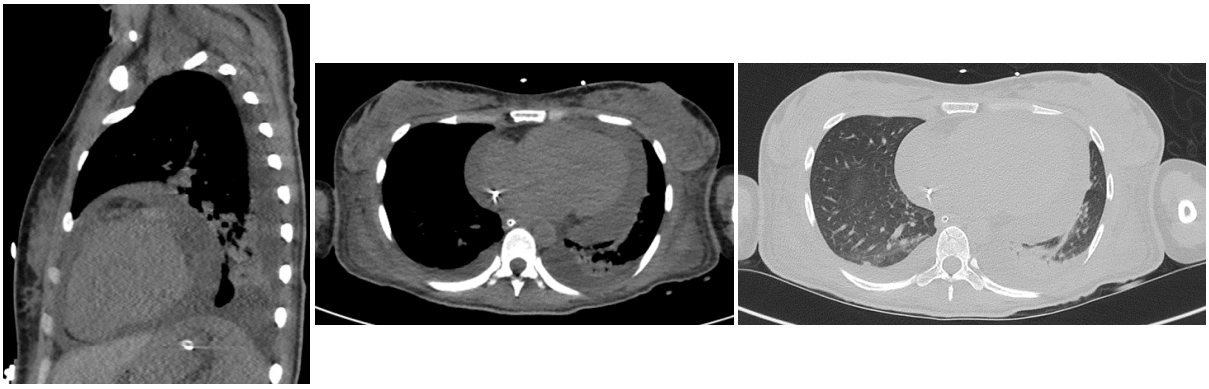
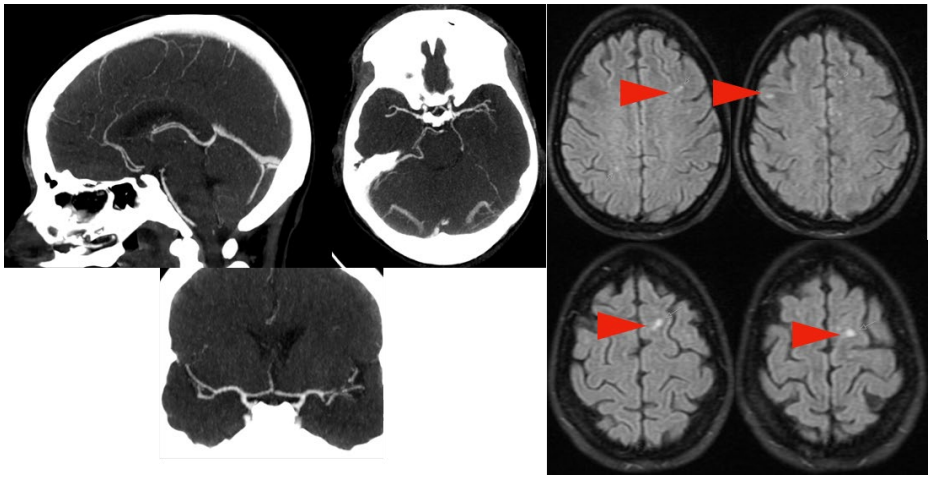


Figure 3. Left: Head MRI with contrast showing right internal carotid, middle cerebral arteries, intracranial vertebral arteries, and posterior cerebral arteries vasculitis (irregularities, narrowing, and stenosis). And Right: Head MRI without contrast showing vasculitis areas (arrows pointing high signal intensity).



Follow-up

The patient was extubated 23 days after admission and 22 of intubation, with good tolerance and no signs of respiratory failure. She was discharged after 54 days of hospitalization, having adequate ventilatory parameters, no neurological signs or symptoms, no inflammatory response, and proper hemodynamic stability.

DISCUSSION

The diagnosis of the case was hindered by the initial clinical presentation, which assimilated an acute systemic disease of a possibly infectious origin. However, after analysis and reevaluation, and following the standards published in September of 2019 by the American College of Rheumatology and the European League Against Rheumatism[8,9], sufficient clinical and laboratory criteria were identified to point the case towards the diagnosis of SLE (Table 1 and 2). An important to consider is that the clinical presentation of this case (weakness in the limbs and hallucinations) contained a significant neurological component evidenced by the brain lesions identified through the MRI and cerebral angiography. Vasculitis of the central nervous system is uncommon among SLE patients. Though greater age-related white matter damage has been found in SLE patients relative to the general population, this does not necessarily explain the fatigue or cognitive alterations experienced by the former[10]. Four cases of brain vasculitis were previously reported in a publication, but the patients in question had already been diagnosed with SLE within the past 5 to 16 years[7]. Our report corresponds to a patient debuts with vasculitis of the central nervous system and is later diagnosed with SLE, thus making this case as special. Additionally, several cases of cerebral infarcts after vasculitis of the central nervous system have been reported, but, in a similar fashion, only in patients who had been previously diagnosed with SLE[11,12]. Nevertheless, an interesting review showed that neuropsychiatric manifestations of SLE are common and frequently associated with a substantial negative impact on health outcomes[13].

In a recent study, autopsies were conducted to evaluate the brain tissues of 16 patients with SLE who presented neuropsychiatric signs and symptoms and compare them to those of 18 patients with SLE who did not have neuropsychiatric manifestations and 24 control patients who died for cardiac causes. The findings reported vasculopathies and depositions of the cerebral complement in the brains of the SLE patients that were absent among the cardiac death patients. Moreover, the brains of SLE patients with neuropsychiatric symptoms presented microthrombi associated with the deposition of complement, a finding that was not identified in patients with SLE but no neuropsychiatric manifestations or let alone those whose deaths were caused by cardiac issues[14].

MRI is a great tool for diagnosis of brain injury, there is possible to determine that 60% of patients with CNS manifestations have white matter lesions, usually in the frontal and parietal subcortical areas; 21% can present infarcts; and 5% hemorrhages. Nevertheless, close to 34% of patients with neurological manifestations present normal MRIs[15].

The techniques for MRI are currently being updated, with its combination with nuclear medicine being one of the greatest advances. That is precisely how the conventional method, proton magnetic resonance spectroscopy (H1-MRS), perfusion weighted imaging (PWI), magnetization transfer imaging (MTI), diffusion tensor imaging (DTI), and functional MRI (fMRI), are all capable of evaluating the cerebral macro architecture, biochemical profile, brain perfusion, macromolecular integration, white matter microstructure, and neuronal connections across different areas of the brain, respectively[16].

Among the laboratory results performed upon admission of our case, an elevation of the hepatic enzymes can be observed, and it may be explained by the same systemic inflammatory process resulting from the antibody attack (against histones, DNA, ribosomes, adenylyl cyclase, profilin II, fibronectin, glycoprotein B2, and neutrophilic cytoplasm). Approximately 21% of SLE cases present hepatic arteritis, and hepatic rupture due to hepatic vasculitis has also been reported[17].

Additionally, the high levels of creatinine kinase (CK) observed may be the result of the attack again the muscle cells. Significant mitochondrial disfunction has been reported in the skeletal muscle cells of patients with fatigue and SLE when compared to healthy controls[18]; close to 50% of patients with SLE present myopathies, which is associated with high CK levels, muscle weakness, and antibodies against ribonucleoproteins. Similarly, the muscle biopsy evidences vasculitis of the small vessels, atrophy of type II fibers, thickening of the vascular wall, neurogenic muscle atrophy, and, on rare occasions, inclusion bodies[19]. Some patients may, however, present acute necrotizing myopathy and rhabdomyolysis[20]. An annual incidence of myositis corresponding to 1.05 cases per every 1000 patients with SLE has been reported; the risk factors associated with this condition include non-Caucasian race, arthritis, Raynaud's phenomenon, and anti-SM antibodies[21].

Regarding our patient, she presented high levels of creatinine kinase, muscle weakness, arthralgia, was non-Caucasian, and was positive for anti-SM and anti-RNP antibodies.

Finally, a positive *Mycoplasma* test was reported two weeks prior to admission to the emergency department; it is difficult to demonstrate an association that establishes *Mycoplasma pneumoniae* as the agent that triggered the onset of SLE. Nevertheless, a retrospective cohort study in Taiwan, consisting of 116,043 patients hospitalized for *Mycoplasma* pneumoniae between 2000 and 2012, reported a significantly high incidence of SLE among infected subjects[22]. Despite this, it is also known that there are no optimal laboratory tests that allow us to accurately diagnose infection by M. *pneumoniae*[23,24]. Also, a described case of a 17-year-old female patient with clinical manifestation of urticarial vasculitis, with history of SLE coexisted with positive *M. pneumoniae* tests, where find the exact cause of vasculitis is unclear (reactivation of SLE or *M. pneumoniae*)[25].

CONCLUSION

We present a patient with generalized vasculitis (muscular, hepatic, renal, and hematological) that affected the neurological system in the onset of the disease and was clinically manifested with weakness of the limbs and neuropsychiatric disturbances. SLE is characterized as a generalized disease product of formation of self-antibodies, systemic inflammation, vasculitis in CNS, lungs, heart, liver, kidneys, skin, gastrointestinal, and musculoskeletal systems[26-28]. In this regard, most of the organ systems mentioned were found to be affected in this case study, with the neurological clinical manifestations being documented in the diagnostic images of the CNS.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

1. Fava A, Petri M. Systemic lupus erythematosus: Diagnosis and clinical management. Journal of Autoimmunity. 2019;96:1–13.
2. Fortuna G, Brennan MT. Systemic lupus erythematosus. Epidemiology, pathophysiology, manifestations, and management. Dental Clinics of North America. 2013;57:631–55.
3. Tiniakou E, Goldman D, Corse A, Mammen A, Petri MA. Clinical and histopathological features of myositis in systemic lupus erythematosus. Lupus Sci Med. 2022;9(1):e000635.
4. Leone P, Prete M, Malerba E, Bray A, Susca N, Ingravallo G, et al. Lupus vasculitis: An overview. Biomedicines. 2021;21:e324.
5. Calle-Botero E, Abril A. Lupus vasculitis. Current Rheumatology Reports. 2020;22:21-29.
6. Bendorius M, Po C, Muller S, Jeltsch-David H. From systemic inflammation to neuroinflammation: The case of neurolupus. International Journal of Molecular Sciences. 2018;19(11):3588
7. Rodrigues M, Galego O, Costa C, Jesus D, Carvalho P, Santiago M, et al. Central nervous system vasculitis in systemic lupus erythematosus: A case series report in a tertiary referral centre. Lupus. 2017;26(13):1440–7.
8. Shaban A, Leira EC. Neurological complications in patients with systemic lupus erythematosus. Current Neurology and Neuroscience Reports. 2019:19(12):97.
9. Narváez J. Systemic lupus erythematosus. Medicina Clinica. 2020;115:494–501.
10. Wiseman SJ, Bastin ME, Hamilton IF, Hunt D, Ritchie SJ, Amft EN, et al. Fatigue and cognitive function in systemic lupus erythematosus: Associations with white matter microstructural damage. A diffusion tensor MRI study and meta-analysis. Lupus. 2017;26(6):588–97.
11. Nishigaichi A, Oiwa H, Hosokawa Y, Hayashi M, Mine N, Nomura E, et al. A case of systemic lupus erythematosus associated with cerebral arteritis: A case report and case-based literature review. Nagoya J Med Sci. 2020;82:807–14.
12. Takeshita S, Ogata T, Tsugawa J, Tsuboi Y. Isolated cerebral vasculitis in the unilateral middle cerebral artery in a case with SLE. Internal Medicine. 2020;59(24):3225–7.
13. Legge AC, Hanly JG. Recent advances in the diagnosis and management of neurophsyquiatric lupus. Nat Rev Rheumatol. 2024;20(11):712-728.
14. Cohen D, Rijnink EC, Nabuurs RJA, Steup-Beekman GM, Versluis MJ, Emmer BJ, et al. Brain histopathology in patients with systemic lupus erythematosus: Identification of lesions associated with clinical neuropsychiatric lupus syndromes and the role of complement. Rheumatology (Oxford). 2017;56(1):77–86.
15. Jenings JE, Sundgren PC, Attwood J, McCune J, Maly P. Value of MRI of the brain in patients with systematic lupus erythematosus and neurologic disturbance. Neuroradiology. 2004;46:15–21.

16. Silvagni E, Bortoluzzi A, Borrelli M, Bianchi A, Fainardi E, Govoni M. Cerebral microstructure analysis by diffusion-based mri in systemic lupus erythematosus: Lessons learned and research directions. Brain Sciences. 2022;12(1):70.
17. Barile-Fabris L, Hernández-Cabrera MF, Barragan-Garfias JA. Vasculitis in systemic lupus erythematosus. Curr Rheumatol Rep. 2014;16(9):25.
18. Cheung SM, Keenan K, Senn N, Hutcheon G, Chan K, Erwig L, et al. Metabolic and structural skeletal muscle health in systemic lupus erythematosus–related fatigue: A multimodal magnetic resonance imaging study. Arthritis Care Res (Hoboken). 20191;71(12):1640–6.
19. Richter JG, Becker A, Ostendorf B, Specker C, Stoll G, Neuen-Jacob E, et al. Differential diagnosis of high serum creatine kinase levels in systemic lupus erythematosus. Rheumatol Int. 2003;23(6):319–23.
20. Jackson N, Babalola T, Betty S, Appiah-Pippim J, Machua W. A case of acute necrotizing myopathy in a patient with systemic lupus erythematosus. American Journal of Case Reports. 2022;23(1):e932867.
21. Cotton T, Niaki OZ, Zheng B, Pineau CA, Fritzler M, Vinet E, et al. Myositis in systemic lupus erythematosus. Lupus. 2021;30(4):615–9.
22. Chu KA, Ou TY, Hung WH, Sung J, Chen W, Lin CL, et al. Mycoplasma pneumonia infection is associated with an increased risk of systemic lupus erythematosus: A nationwide, retrospective cohort study. Front Microbiol. 2022;13(April):1–10.
23. Montagnani F, Rossetti B, Vannoni A, Cusi MG, de Luca A. Laboratory diagnosis of Mycoplasma pneumoniae infections: Data analysis from clinical practice. New Microbiologica. 2018;41(3):203–7.
24. Kurkela S, Puolakkainen M, Hokynar K, Nieminen T, Saxen H, Mannonen L, et al. Mycoplasma pneumoniae outbreak, Southeastern Finland, 2017–2018: molecular epidemiology and laboratory diagnostic lessons. European Journal of Clinical Microbiology and Infectious Diseases. 2019;38(10):1867–71.
25. Diplomatico M, Gicchino MF, Ametrano O, Marzuillo P, Olivieri AN. A case of urticarial vasculitis in a female patient with lupus: Mycoplasma pneumoniae infection or lupus reactivation? Rheumatol Int. 2017;37(5):837–40.
26. Tani C, Elefante E, Arnaud L, Barreira SC, Bulina I, Cavagna L, et al. Rare clinical manifestations in systemic lupus erythematosus: A review on frequency and clinical presentation. Clin Exp Rheumatol. 2022;40:93–102.
27. Emad Y, Ragab Y, Hammam N, El-Shaarawy N, Ibrahim O, Gamal RM, et al. Autoantibodies to extractable nuclear antigens (ENAs) pattern in rheumatoid arthritis patients: Relevance and clinical implications. Reumatol Clin. 2021 May 1;17(5):250–7.
28. Carrión-Barberà I, Salman-Monte TC, Vílchez-Oya F, Monfort J. Neuropsychiatric involvement in systemic lupus erythematosus: A review. Autoimmunity Reviews. 2021;20(4):102780.