CASE REPORTS

Life threatening pericardial and neurologic presentations in systemic lupus erythematosus

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Received: May 14, 2018 **Accepted:** June 10, 2018 **Online Published:** June 13, 2018
DOI: 10.5430/crim.v5n3p6 **URL:** https://doi.org/10.5430/crim.v5n3p6

ABSTRACT

Background: Posterior reversible encephalopathy syndrome (PRES) is characterized by altered mental status, visual perception abnormalities and seizures. Systemic lupus erythematosus (SLE) is a rare etiology of PRES and affects less than 1% of SLE patients. We present a unique case of a new-onset SLE patient presenting with borderline cardiac tamponade requiring emergent pericardiocentesis and hospital course complicated by intractable seizures found to have PRES on imaging.

Case presentation: A 21-year-old female underwent outpatient evaluation for new-onset SLE presenting to the emergency room with dyspnea. She was found to have a large circumferential pericardial effusion with borderline tamponade features requiring emergent pericardiocentesis. On her fifth hospital day, she developed generalized motor seizure (tonic-clonic) with magnetic resonance imaging (MRI) revealing bilateral parieto-occipital edema consistent with a radiographic diagnosis of PRES. Induction therapy with mycophenolate was started and follow-up studies showed improvement in the cortical and subcortical regions on MRI with no evidence of recurrent pericardial effusion.

Conclusions: PRES is a rare complication of lupus and has been infrequently described in literature. It is thought that the association is secondary to the effect of SLE on endothelial dysfunction and the effect of cytotoxic medication on the loss of autoregulation of systemic hypertension. It is important to recognize this condition and its significant associations as early detection and intervention often lead to favorable outcomes. To our knowledge, this is the first case report of SLE with associations of both PRES and circumferential pericardial effusion with tamponade physiology, both of which are rare in the SLE patient population.

Key Words: Posterior reversible encephalopathy syndrome, Lupus, Systemic lupus erythematosus, Tamponade, Pericardial effusion

1. BACKGROUND

Reversible posterior leukoencephalopathy syndrome (RPLS) is a group of etiologies that include Posterior reversible encephalopathy syndrome (PRES), reversible posterior cerebral edema syndrome, posterior leukoencephalopathy syndrome, hyper-perfusion encephalopathy, and brain capillary syndrome. Systemic lupus erythematosus (SLE) is a rare etiology of PRES. PRES itself affects less than 1% of SLE patients.[1] It is characterized clinically by altered mental status, visual perception abnormalities and new-onset seizures. It is characterized on radiology by vasogenic edema in the occipital and parietal regions likely related to the involvement of the posterior cerebral artery supply in more than 95% of the time.[2] Cases have been described outside of

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the posterior cerebral artery distribution, mainly in the watershed areas, and can also involve the basal ganglia and the cerebellum.[3,4] The presentation of PRES can mimic neuropsychiatric lupus and may be obscured by concurrent hypertension, kidney involvement and the use of immunosuppressive agents. The association of PRES with SLE is thought to be secondary to the effect of SLE on endothelial dysfunction and the effect of cytotoxic medications on the loss of auto-regulation of systemic hypertension. It is important to recognize this condition and its associations as early detection and intervention often lead to favorable outcomes.

As a disease of the connective tissue, SLE involvement of the pericardium is well established and can manifest as pericarditis and/or pericardial effusion, although the initial presentation of pericardial effusion with tamponade is uncommon.[5,6] In the majority of cases, the effusion is mild and diffuse in nature. Proper treatment with pericardiocentesis followed by high-dose corticosteroids often leads to a favorable outcome. Recurrence and complications such as constrictive pericarditis are rarely seen following proper treatment in the literature.[7]

In this report, we present a unique case of a diagnostic and therapeutic challenge in a SLE patient presenting with pericardial effusion with borderline tamponade features, complicated by intractable in-hospital seizures and found to have PRES on imaging.

2. Case presentation

A 21-year-old African American female with no significant past medical history underwent outpatient evaluation for new-onset of dyspnea, arthralgia and alopecia. Laboratory evaluation returned antinuclear antibody (ANA) titer of > 1:5,210 speckled pattern, erythrocyte sedimentation rate (ESR) of 130 and C-reactive protein (CRP) of 4.94, low C4, normal C3/CH50, high IgG without M spike, anti-Smith+, ribonucleoprotein (rNP)+, rheumatoid factor (RF)+, Ro+, Scl70+, double strand DNA (DsDNA)-, cyclic citrullinated peptide (CCP)-, anti-Sjogren syndrome related antigen (SSA)+ and nephrotic range proteinuria. Lupus anticoagulant and cardiolipin antibody panel was negative. On admission, vitals were remarkable for tachycardia to 110-120, otherwise normotensive and saturating well on room air. Physical exam was notable for bilateral upper extremity sclerodactyly, right arm edema and pericardial frictional rub. Labs were remarkable for mild leukocytosis and hemoglobin of 8.4. TTE was ordered and revealed large pericardial effusion meeting criteria for tamponade physiology (diastolic collapse of right sided chambers).[8] Urgent IR-guided pericardiocentesis revealed an exudative pattern in the fluid studies and the extent of pericardial effusion can be seen on the subsequent computed tomography angiography in Figure 1. Patient was treated with intravenous methylprednisolone 500 mg and oral hydroxychloroquine 400 mg daily. On the fifth hospital day, she developed a generalized motor seizure (tonic-clonic) aborted with 2 mg of lorazepam. She was intubated emergently due to poor respiratory effort in the postictal state, loaded with intravenous levetiracetam 1,500 mg and maintained on intravenous levetiracetam 1,500 mg and phenytoin 100 mg twice daily. Magnetic resonance imaging (MRI) revealed bilateral parieto-occipital edema consistent with a radiographic diagnosis of PRES in Figure 2. After extubation she had another episode of generalized motor seizure (tonic-clonic) and required re-intubation for airway protection due to acute respiratory failure. During both seizures, her systolic blood pressure was relatively normotensive (107-149/62-104). Renal biopsy showed Class V membranous lupus nephritis. Cyclophosphamide was indicated given the disease severity but deferred due to patient's young age and potential side effect of ovarian failure in this particular age group. Induction therapy with mycophenolate 1,000 mg daily and strict blood pressure control with lisinopril 20 mg daily was initiated and follow-up studies showed radiographic improvement in the cortical and subcortical regions on MRI and no evidence of recurrent pericardial effusion on repeated echocardiogram. Patient was discharged on hospital day twenty with close outpatient follow-ups.

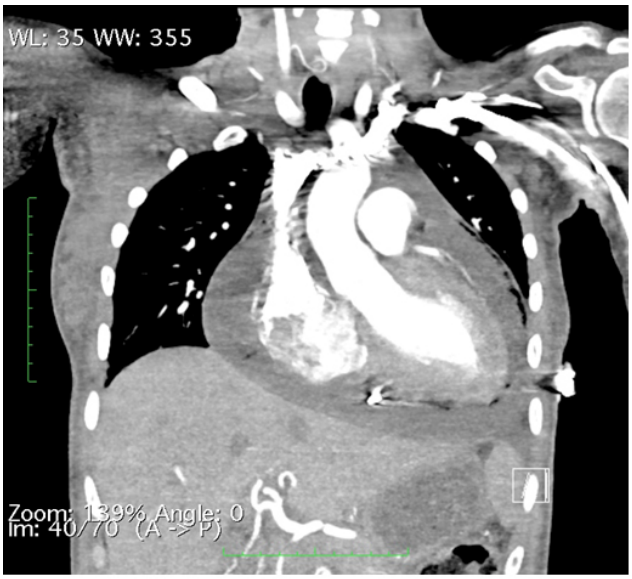

Figure 1. Circumferential pericardial effusion on CT angiogram

TTE initially showed borderline tamponade physiology with subsequent emergent IR-guided pericardiocentesis and following CT angiogram image here demonstrating pericardial effusion in a circumferential fashion after approximately 1L of fluid removed. Pericardiocentesis catheter can be clearly seen here as well.

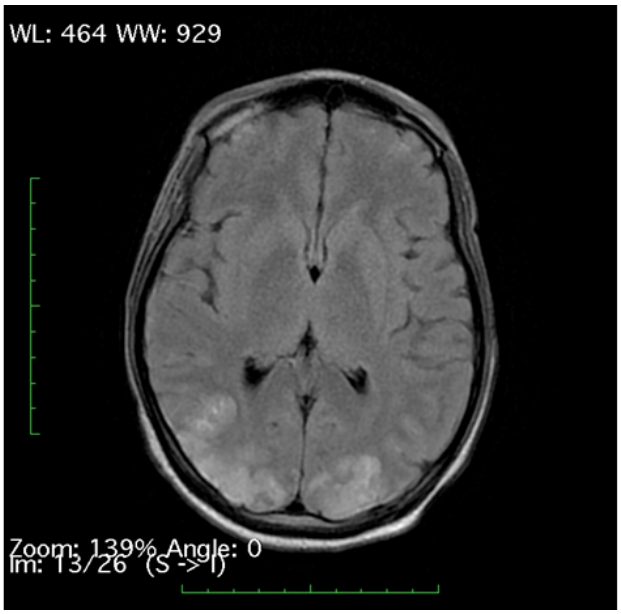

Figure 2. Vasogenic edema on MRI
Axial T2-FLAIR MRI image here demonstrating hyper-intensity foci in the bilateral parietal lobes, which are characteristic distribution of vasogenic edema in PRES with likely involvement of posterior cerebral artery circulation.

3. Discussion and conclusions

PRES was first described in literature in 1996.[9] In recent years, PRES has been described more frequently in case reports and retrospective studies with the increasing availability of MRI. PRES is a rare complication of SLE and the prevalence in one retrospective case series has been estimated to be approximately 0.69% among SLE patients. In one of the largest case series, SLE was associated with 9% of the 120 PRES cases studied.[10] The theory behind the association of autoimmunity and PRES is attributed to endothelial activation followed by protein and fluid leakage into the interstitium.[11,12] In limited retrospective studies, PRES in SLE is more likely to occur in the younger female population, with risk factors such as prior exposure to cytotoxic medications, renal involvement, severe hypertension, and severe SLE disease activity.[13–15] The most common etiologies of PRES include malignant hypertension, eclampsia, chemotherapy agents and immunosuppressive medications.

SLE disease progression can lead to endothelial dysfunction and the effect of cytotoxic medications can lead to the loss of autoregulation of systemic hypertension and hyper-perfusion in the cerebral vasculature. According to the hyper-perfusion theory, severe elevation in blood pressure leads to deregulation of arteriolar constriction, transient vasodilation and hyper-perfusion which then leads to damage of the blood-brain-barrier and extravasation of fluid, protein and even blood. Therefore, PRES can either be a consequence of the cytotoxic medical therapy or a manifestation of SLE disease process itself. Our case presents supportive evidence for the latter because episodes of seizure and subsequent radiographic findings of PRES occurred prior to initiation of medical therapy. In addition, studies have shown that an elevated interleukin-10 and other inflammatory markers are correlated with both PRES and SLE disease activity.[16,17]

Furthermore, our patient's blood pressure was relatively normotensive while on telemetry monitoring both prior to and during the episodes of seizure activities. PRES in a normotensive patient has only been very rarely described in literature.[18,19] It is unclear if involvement of PRES is an indicator of advanced disease process. In one study, the majority of SLE patients with PRES required intensification of their maintenance therapy.[15] Early detection and intervention often lead to favorable outcomes and prevent complications (10%-15% of the cases) such as infarction and hemorrhage.[20–22] However, cases of permanent cerebral injury and residual neurological deficits have been described in literature and percentage of patients with no complete resolution on imaging can be as high as 27.5% in a retrospective study.[23]

Cardiac involvement of SLE includes pericarditis, myocarditis, endocarditis, effusion and conduction system abnormality. Pericardial effusion in SLE patients usually manifests itself as diffuse and circumferential in nature. It is more commonly seen in females and in the elderly population.[24] Tamponade has been documented as a potential initial presentation of SLE patients and its prevalence can be as high as 5.9% in certain cohort.[25] Pericardiocentesis is the treatment of choice and generally lead to a benign evolution. In rare cases with hemodynamic instability, emergency surgery and pericardiectomy are needed. Complications and recurrence are uncommon following proper treatment.

In conclusion, this is the first case report of SLE with associations of both PRES and circumferential pericardial effusion with tamponade physiology, both of which are rare but documented in the SLE patient population. However, concurrent presentation is exceedingly rare in the clinical practice and offers insight that both may be due to similar underlying pathophysiological process that prompt further investigation. A patient presenting with signs and symptoms concerning for both should prompt proper treatment and workup despite its rarity.

Consent

Consent for publication was obtained from the patient.

Conflicts of Interest Disclosure

The authors declare no conflicts of interest.

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