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COMPETITION WINNER

Coronary heart disease

Young mother with lupus and life-altering cardiocerebrovascular nightmare: a case report

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Background Systemic lupus erythematosus (SLE) predominantly affects women and increases their cardiovascular disease risk up to three-fold. Young women with SLE face various challenges and gender-specific issues, especially concerning pregnancy.

Case summary A female patient, 37 years old, married with two children, hospitalized for SLE, consulted for chest pain, shortness of breath, and dry cough. She quit her medication in the past 7 years prior to her admission in the hope of conceiving. Physical examinations showed signs of heart failure. Electrocardiogram revealed recent myocardial infarction. She had increased hs-Troponin T 180.3 pg/mL and NTproBNP 13 419 ng/L. An echocardiogram demonstrated a low ejection fraction at 30.4%, left ventricle thrombus, and wall motion abnormalities. The angiogram showed severe coronary artery disease. Her condition was then complicated by embolic stroke and recurrent bleeding from anticoagulant subcutaneous punctured sites.

Discussion Patients with SLE are prone to hypercoagulability and accelerated atherosclerosis, which may lead to pre-mature mortality. In this case, balancing risk for bleeding vs. ischaemia is a see-saw decision. The current risk scores do not cater specifically to this population, but the existing ones suggest this patient will have an equally undesired outcome. Hence, a multi-disciplinary team discussion was needed. Considering the immense risk of any intervention at the time, the decision was to administer a conservative treatment.

Conclusion Recognizing and anticipating gender-specific issues in managing patients with SLE are keys to preventing catastrophic complications. Multi-disciplinary team involvement is critical in dealing with complex cases.

Keywords Myocardial infarction • Systemic lupus erythematosus • LV thrombus • Acute embolic stroke • Bleeding risk • Case report

ESC Curriculum 3.2 Acute coronary syndrome • 2.2 Echocardiography • 6.2 Heart failure with reduced ejection fraction • 6.5 Cardiomyopathy • 9.9 Cardiological consultations

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Learning points

- Recognize gender-specific issues and emphasize the importance of medication compliance.
- Advocate for multi-disciplinary team discussion, which is critical when facing complex cases.

Introduction

Systemic lupus erythematosus (SLE)—a systemic autoimmune disease predominantly affecting women—comes with heterogenous clinical presentations that may cause a cardiocerebrovascular disease.[1] SLE prevalence varies worldwide. In USA, data show that SLE was more common among black, Asian, and Hispanic young women, with 241, 90.5, and 94.7 cases per 100 000 persons, respectively. Meanwhile, the prevalence was only 55.2 per 100 000 among white women.[2] In Asia, data show a prevalence ranging between 20.6 and 97.5 cases per 100 000.[3] Globally, epidemiology data demonstrate similar increases in the prevalence over time in both hemispheres.[3]

Timeline

Time	Event
18 years prior	Patient was diagnosed for SLE and was treated accordingly.
7 years prior	Patient just got married and decided to quit her treatment without notifying her rheumatologist.
6 months prior	Patient was hospitalized due to COVID-19.
3 months prior	Lack of appetite and started losing weight. Mostly bedridden due to pain on her joints.
20 August	Patient visited rheumatologist outpatient clinic and was admitted to general ward due to general weakness, shortness of breath, and cough
21 August	Onset of chest pain. Electrocardiogram and laboratory results of serial hs-troponin showed recent myocardial infarction (MI).
22 August	Patient was transferred to intensive cardiac care unit and was given dual antiplatelets and anticoagulant for her recent MI. Angina symptoms improved.
23 August	Echocardiography showed low left ventricle (LV) ejection fraction, regional wall motion abnormality, and LV thrombus.
24 August	Coronary angiogram showed three vessel diseases and left main disease with two chronic total occlusions in proximal-to-mid right coronary artery and in mid-left anterior descending. Patient started to have bleeding from subcutaneous puncture sites that needed compression dressing. Anticoagulant was withheld.
25 August	Patient suddenly had difficulty speaking and paralysis on her right side. Urgent consult to neurologist was done. Magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) showed wide area of hyperacute infarct, flair vascular hyperintensity in left cerebral hemisphere, and thrombus in left internal carotid artery. Given the bleeding had stopped, reduce dose of anticoagulant was given at night which resulted in another bleeding episode from the same sites. Multi-disciplinary team was then formed consist of cardiologist, cardiothoracic surgeon, neurologist, neurosurgeon, and interventional radiologist.
26 August	Echocardiography showed reduction in thrombus size.
27 August	Patient moved to stroke unit to monitor her condition further and continued her physical rehabilitation.
30 August	Patient moved to general ward to continue her rehabilitation programme.
12 September	Patient was discharged to continue her physical rehabilitation in outpatient rehabilitation centre.
14 October	Patient showed small improvement in speech. She still had paralysis on her right side.
27 January	Patient showed more improvement in speech and movement. She could stand up and her right-leg mobility was slightly improved although her right-arm mobility was still severely impaired. She was suggested to continue the rehabilitation programme.

Myocardial infarction is commonly found in patients with SLE—mostly a first with significant coronary artery disease.[1] Direct causality of SLE with MI remains undetermined but previous studies have shown the association of autoimmune disease with accelerated atherosclerosis process, which leads to increased cardiocerebrovascular risk.[4,5]

This case report showcases severe complications of SLE in a young mother to highlight gender-specific issues faced by a majority of patients with SLE and emphasizes the importance of a multi-disciplinary involvement of the team in managing complicated cases.

Case presentation

A 37-year-old mother of two with an 18-year history of SLE tested positive for COVID-19 6 months before her admission was presented with shortness of breath and cough. For the last 7 years, she did not take her SLE medications in order to conceive. In the past 3 months, she lost appetite and weight and suffered from worsening joint pain—rendering her bedridden. Having general weakness at presentation, her rheumatologist subsequently admitted

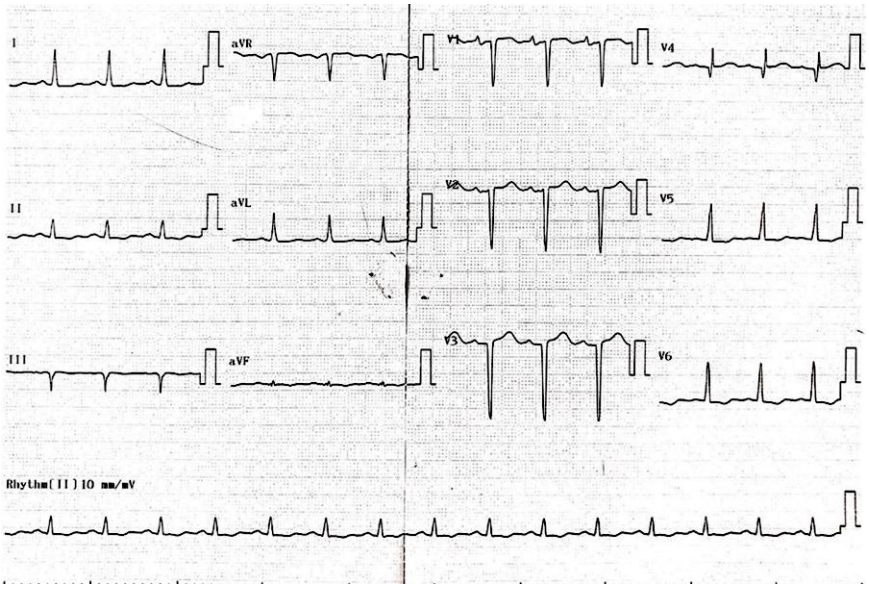

Figure 1 Electrocardiogram on admission.

her, during which she experienced chest pain. Her vital signs showed blood pressure of 117/80 mmHg, heart rate 99 beats per minute, respiration rate 24 times per minute, and SpO_2 95% with 3 L/min of supplemental oxygen. Diastolic and systolic murmurs were heard in the left second intercostal space and the apex of the heart, respectively. Both feet had mild pedal oedema.

Electrocardiogram revealed recent anteroseptal MI (*Figure 1*). The following laboratory results were significant: hs-Troponin T 180.3 pg/mL (0–14 pg/mL), which increased to 265.6 pg/mL 12 h later; NTproBNP 13 419 ng/L (0–450 ng/L for age <50 years); C-reactive protein-hs 9.27 mg/L (0–3 mg/L); and low-density lipoprotein 235 mg/dL (<100 mg/dL). Echocardiogram showed dilated left atrium and LV with eccentric LV hypertrophy; ejection fraction of 30.4%; decreased right ventricular function with tricuspid annular plane systolic excursion of 1.2 cm; severe regional wall motion abnormalities; and spontaneous echo contrast in LV and a 2.77 × 1.44 cm thrombus (*Figure 2A*).

Coronary angiogram revealed a complicated, significant, and diffuse coronary artery disease with left main involvement (*Figure 3*). The patient was already on dual antiplatelets and subcutaneous anticoagulant. Active bleeding was observed from subcutaneous puncture sites, which was treated with compression bandaging and anticoagulant suspension. The next day, the patient had blood seeping from the bandage, difficulty in speaking, and paralysis on her right side. Urgent echocardiogram showed LV thrombus size reduction to 1.16 × 0.586 cm (*Figure 2B*). Brain MRI and MRA showed a wide hyperacute infarct area, left cerebral hemisphere flair vascular hyperintensity, and left internal carotid artery thrombus (*Figure 4*).

A multi-disciplinary discussion with the patient's family—involving a rheumatologist, a cardiologist, a cardiothoracic surgeon, a neurologist, a neurosurgeon, and an interventional radiologist—was initiated to determine whether a pharmacological, mechanical thrombolytic,

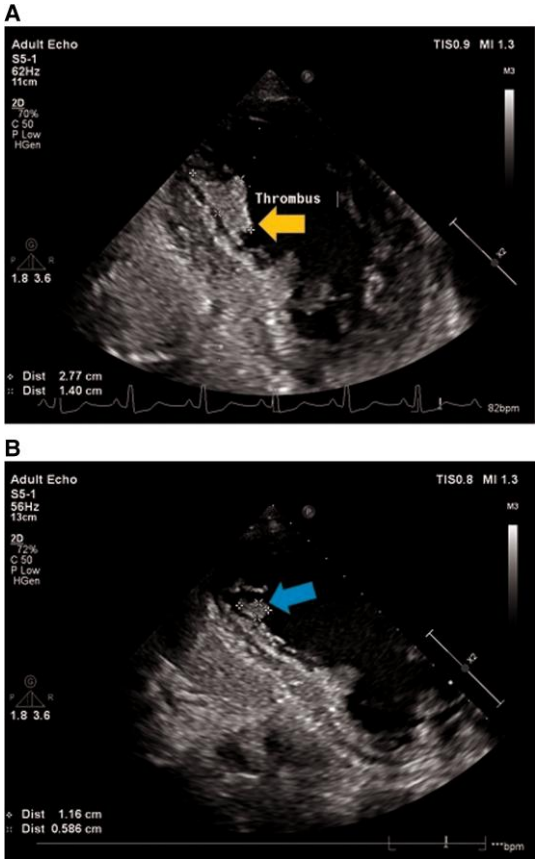

Figure 2 (*A*) First echocardiogram (23 August) showing left ventricle thrombus size 2.77 × 1.4 cm. (*B*) Second echocardiogram (26 August) showing left ventricle thrombus size 2.16 × 0.586 cm.

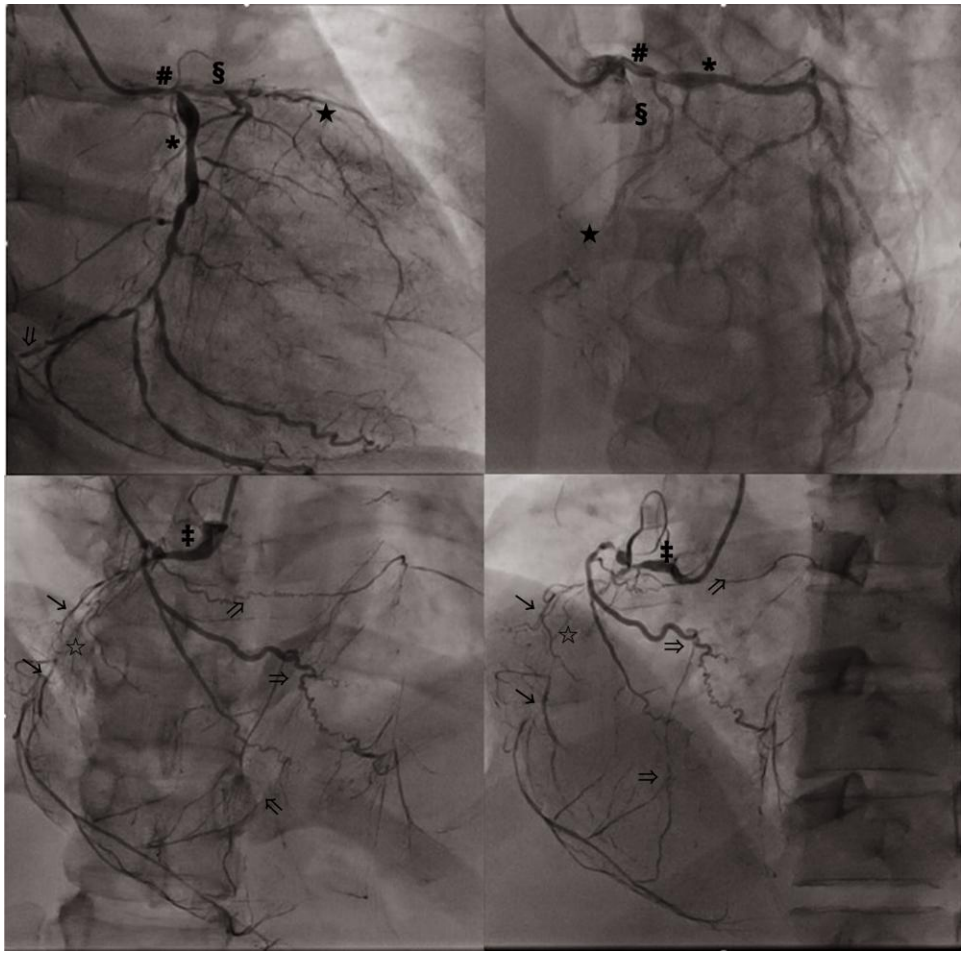

Figure 3 Coronary angiogram demonstrating three vessel diseases and left main disease. Left main (#) was short in length with significant proximal-to-distal stenosis, Medina 1-1-1; left anterior descending (§), diffuse disease with significant stenosis from ostium to distal with chronic total occlusion (★) on mid-left anterior descending; left circumflex (*), diffuse disease with significant stenosis in ostium and distal; right coronary artery (‡), diffuse disease with long chronic total occlusion (☆) in proximal to mid, bridging collateral (→) in proximal-to-mid right coronary artery. Other collaterals (⇒) were seen from sinus node branch to left anterior descending septal branches, from distal left circumflex to distal right coronary artery (Rentrop 2), and from left posterior descending branch to right posterolateral branch.

or conservative treatment should be administered to treat the patient's embolic stroke. Given the possible consequences, the decision was to administer a conservative treatment. The heart team concluded that the coronary vessels were not graftable. As per guidelines, the patient was discharged with a dual antiplatelet, high-intensity statin, and heart failure medications, along with her SLE medications. After a rigorous physical rehabilitation, her motoric functions and speech ability improved.

Discussion

Gender disparity is highlighted in this report by considering several factors: medical care management, the under-representation of women in medical research, and gender-specific disease management. Female-specific diseases, like SLE, require special considerations and approaches.

The clinical course of SLE may vary from a relatively benign illness to rapidly progressive disease. The management should improve patient outcomes in the long-term by reducing symptoms and signs, preventing collateral damage, minimizing drug side effects, and enhancing quality of life. Accelerated atherosclerosis, pulmonary hypertension, and antiphospholipid syndrome are among the treatable comorbid conditions; hence, screening tests should be done rigorously.[6,7] Non-invasive techniques should be considered when identifying stenotic coronary lesions in asymptomatic patients or those with non-specific symptoms.[8]

Meta-analysis of real-world observational studies found that patients with SLE have a three-fold increased risk of MI and double risk of stroke. Compared with an age-matched control, younger patients with SLE have a higher relative risk for stroke.[9] This may be due to accelerated atherosclerosis and the traditional cardiovascular and SLE-related risk factors. The patient ceased her SLE medications, causing uncontrolled inflammation. She was also tested positive for COVID-19 6 months before the admission. SARS-CoV-2, the virus causing COVID-19, may induce inflammation and hypercoagulability.[10] How long these conditions persist after recovery from

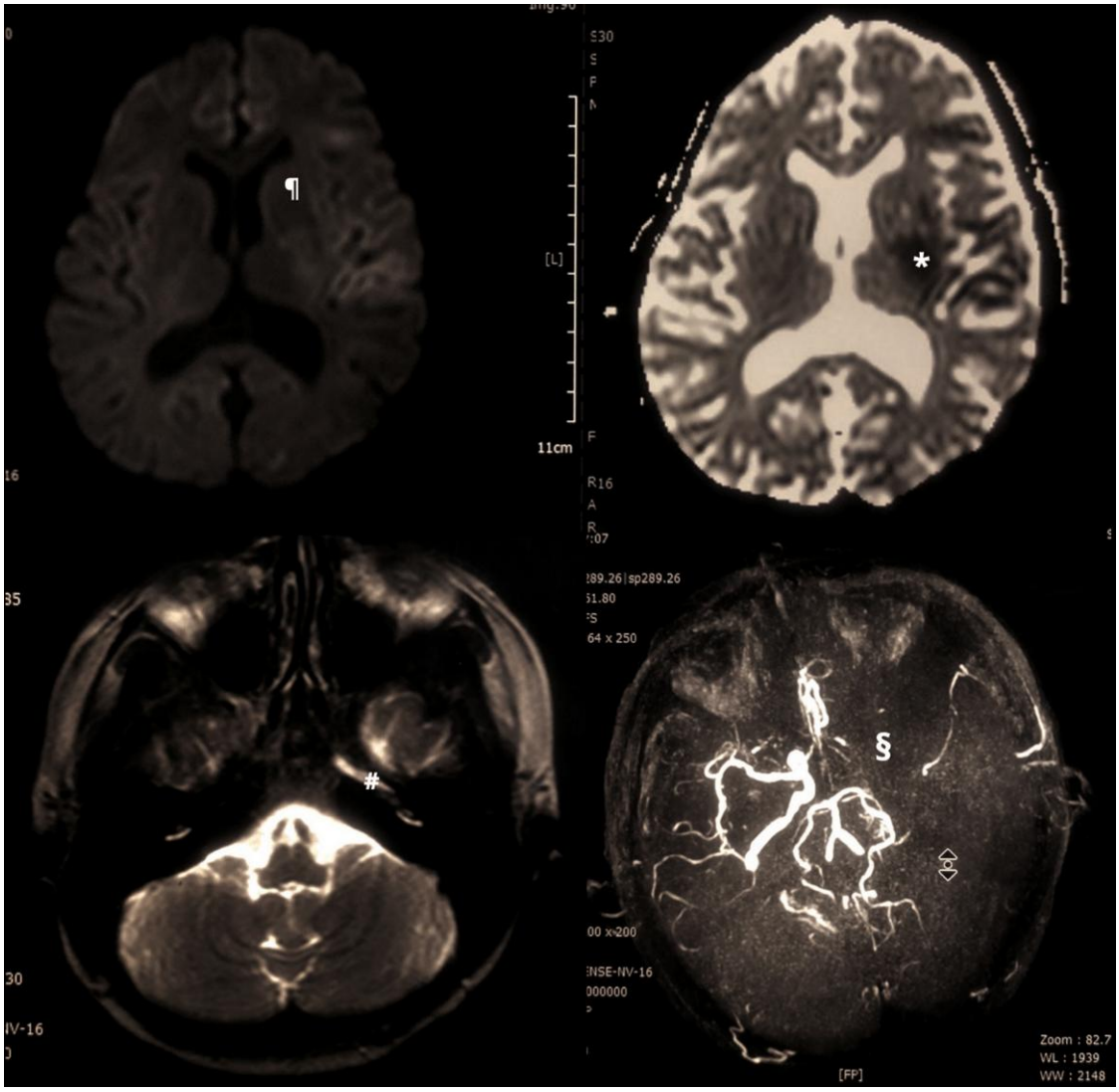

Figure 4 Wide infarct in left frontal lobe, left centrum semiovale, left corona radiata, left parietal lobe, left basal ganglia, left internal capsule, left insula, left temporal lobe in diffusion-weighted imaging (DWI) hyperintense (¶). The infarct in apparent diffusion coefficient (ADC) hypointense (*). This showed restricted diffusion/hyperacute infarct. Thrombus (#) seen in left internal carotid artery. Thrombus occlusion (§) seen in magnetic resonance angiography.

COVID-19 is not yet known. Virchow's triad states that there are three major factors contributing to thrombus formation: (i) hypercoagulability, for example, major surgery/trauma, malignancy, pregnancy, acute coronary syndrome, an autoimmune condition, infection, and sepsis; (ii) vascular or endothelial damage, for example, injury to blood vessels, cellulitis, thrombophlebitis, and atherosclerosis; (iii) circulatory stasis, for example, heart failure, LV regional wall abnormality, atrial fibrillation, immobility, and venous obstruction.[11] The patient had high thrombotic risk of non-compliant SLE, a recent MI, and immobility.

Patients with SLE have an increased risk of thrombosis, which may be further amplified by certain risk factors, such as antiphospholipid antibodies, inflammation, and other thrombophilic and traditional risk factors, and certain medications, for example, glucocorticoids.[2,5] Such conditions may justify the administration of anticoagulants and the deferred decision for surgical revascularization. A CRUSADE score of 37 indicates moderate bleeding risk, with a 12.1% risk of major bleeding, so she was prescribed dual antiplatelets and subcutaneous anticoagulant (enoxaparin).[12] Due to the bleeding complications, an anticoagulant administration was withheld. A subsequent acute stroke embolism further complicated the situation. In an acute setting, it is reasonable to propose a thrombolytic therapy. If it is within the golden period of thrombolysis, mechanical thrombectomy is advisable.[13] However, no guidelines exist for treating patients with SLE with recent MI, LV thrombus, or acute embolic stroke, and only a few cases have reported the use of thrombolysis[13,14] or mechanical thrombectomy.[15,16] Considering the reperfusion injury risk and recent bleeding episodes, the multi-disciplinary team discussion

with the patient's family decided not to proceed with either treatment.

Cardiovascular disease prevention and treatment for patients with or without SLE are similar. These include smoking cessation, regular exercise, lipid and blood pressure control, low-dose aspirin, and avoidance of glucocorticoids.[6] Hydroxychloroquine, widely used in SLE, also has additional anti-thrombotic and anti-atherogenic benefits.[7] Patients with moderate-to-severe SLE should be referred to a cardiologist to assess cardiac risk factors and recommend screening and treatment options to minimize the risk of future complications.

Conclusion

In this case report, the non-compliance with SLE medications was due to the desire to conceive. Physicians should recognize and anticipate such gender-specific concerns. Additionally, as SLE can result in severe cardiocerebrovascular complications with potentially life-altering consequences, it is vital for the multi-disciplinary team to open a dialogue with the patient and their caregivers.

Lead author biography

Dr Indah Sukmawati presently works as general cardiologist and staff lecturer in Department of Cardiovascular at Siloam Hospitals Lippo Village and Medical Faculty of Universitas Pelita Harapan in Tangerang, Banten, Indonesia. She currently serves as the secretary for Woman Cardiology Working Group of Indonesian Heart Association. She is passionate about interventional cardiology, heart failure, and cardiovascular disease in women.

Supplementary material

Supplementary material is available at *European Heart Journal – Case Reports* online.

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Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as Supplementary data.

Consent: The authors confirm that written consent for submission and publication of this case report, including imaging and associated text, has been obtained from the patient according to COPE guidance.

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