CLINICAL VIGNETTE

Cardiovascular Manifestations of Systemic Lupus Erythematosus (SLE)

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Case Report

A 62-year-old woman with a history of dyslipidemia and SLE with frequent arthritic flares was referred by Rheumatology for burning chest pain occurring at rest. The patient described a 3-week history of exertional "heartburn" that was relieved at rest. However, upon admission, she presented with chest pain at rest. Regarding her SLE, she was not adherent with Rheumatology follow-up and disease modifying anti-inflammatory therapy. She took prednisone intermittently. Dyslipidemia was managed with diet and exercise; however, it was not well controlled as patient's exercise tolerance was limited secondary to debilitating arthralgia.

ECG was suggestive of anterior ischemia and labs were significant for elevated cardiac enzymes. She was started on medical therapy per Acute Coronary Syndrome protocol (AHA guideline-based) and underwent early invasive strategy for NSTEMI.

Left heart catheterization revealed a 90% stenosis in the proximal portion of the LAD at the branchpoint of the first diagonal artery (D1). We subsequently performed aspiration thrombectomy, kissing balloon technique, and stent placement to the LAD bifurcation lesion at D1.

Transthoracic echocardiogram (TTE) revealed moderate anteroseptal and apical hypokinesis, as well as moderate to severely reduced left ventricular ejection fraction of 25-30%.

She was medically optimized from a heart failure and post-MI standpoint and discharged home 5 days later. Her follow-up LVEF on TTE had improved to 45-50%.

Discussion

Systemic Lupus Erythematosus (SLE) is an inflammatory disease that results from immune complex (C3, C4 complement) deposition in a multiorgan distribution. Key criteria required for establishing diagnosis include serositis, arthritis, glomerulonephritis, hematologic derangements, and psychiatric pathology. Although it has recently been touted as a relative risk factor for cardiovascular disease (CVD), SLE approximates the cardiovascular risk of the metabolic syndrome. It comprises a largely forgotten group of women at risk of CVD. Thus, a major focus of treatment should be early recognition and control of their cardiovascular risk factors.

Cardiovascular Disease and SLE

SLE has significantly higher prevalence in women as compared to men at any age. It has been shown to be an independent risk factor for the development of coronary artery disease (both epicardial and microvascular), valvular heart disease, peripheral vascular disease (atherosclerotic, thrombotic), conduction system disease, and myocardial as well as pericardial diseases. Mechanisms that have been proposed include accelerated atherosclerosis, arterial stiffness, endothelial dysfunction, in addition to direct immune complex-mediated injury to endocardial surfaces.

CAD

SLE was shown to be an independent predictor of CAD in a subset of patients evaluated in the Helsinki Heart Study. The pathophysiology of this process has been described as accelerated atherosclerosis triggered by the effects of anti-endothelial cell Ab. These patients were also found to be at high risk for re-occlusion following revascularization.

Case-control studies examining preclinical carotid atherosclerosis and coronary artery calcification clearly indicate that premature atherosclerosis occurs in SLE.[1] Atherosclerosis progresses at twice the rate and is directly related to duration of disease and homocysteine levels.

Triglycerides and homocysteine are elevated in lupus; however, levels of total, HDL, and LDL cholesterol are not elevated. Imaging studies also indicate an underlying pathophysiology of atherosclerosis rather than in situ thrombosis associated with antiphospholipid antibody syndrome (APA).[2]

Additionally, antiphospholipid antibody syndrome (APA) often occurs concomitantly with SLE in >20% cases, which itself is an independent risk factor for arterial and venous thrombosis, valvular heart disease, and pulmonary hypertension.[3]

SLE-Pericardial Disease

Pericardial disease is the most common clinical cardiovascular manifestation. Clinical features of pericarditis with or without pericardial effusion occurred in 20-50% of patients in a relatively large series. Pericardial effusions develop in the setting of active disease (flares) but may be asymptomatic. Effusions are usually small, although moderate to large pericardial effusions were detected in 5 of 70 patients (7%) in one series.[4] Generally, fluid is indistinguishable from bacterial exudate and pericardial tamponade and constriction may occur.

SLE-Arrhythmias/Conduction Disease

In SLE, sinus tachycardia, atrial fibrillation, and atrial ectopic beats are the major cardiac arrhythmias. In small vessel vasculitis SLE, there may be infiltration of the sinus or atrioventricular (AV) nodes, and active myocarditis, which can lead to first-degree Atrioventricular Block (AVB) in 34–70%.[4] In contrast to Rheumatoid Arthritis (RA), conduction abnormalities may regress with control of disease.

In neonatal lupus, 3% of infants whose mothers are antibody-positive develop complete heart block (CHB). And although hydroxycloroquine is the mainstay of treatment, it is not without its own toxicity, including hydroxychloroquine induced CHB and cardiomyopathy.

SLE-Cardiomyopathy

Pathophysiology is purported to be primarily ischemic, although other entities described include toxic cardiomyopathy (hydroxychloroquine-induced) and lupus myocarditis. Clinical diagnosis of cardiomyopathy has been reported in up to 21%. Definitive diagnosis of myocarditis is often not made with echocardiography alone; however, it should be considered in the setting of non-ischemic cardiomyopathy of unclear etiology. Diagnosis is generally made with echocardiogram with or without myocardial perfusion studies and endomyocardial biopsy.

Therapy is aimed at the underlying cause. Toxic myocarditis generally resolves with removal of the offensive agent; however, it may persist indefinitely, whereas lupus myocarditis may improve with aggressive anti-inflammatory therapy.

SLE-Valvular Disease

Verrucous vegetations (Libman-Sacks endocarditis) are the main etiology of valvulopathy seen in SLE. These are non-bacterial vegetations that may affect the valve leaflets and the papillary muscles. Rarely, these vegetations can become a nidus for bacterial superinfection. Valve incompetence may present as congestive heart failure. The most dreaded complication, however, is brain emboli.[5]

Summary

Although there are no consensus guidelines regarding treatment for cardiovascular disease in women with SLE, therapy is targeted at CVD risk reduction. Although no robust longitudinal cohort study shows the long-term cardiovascular effects of SLE, there is direct evidence of risk in small trials of CVD risk from coronary artery calcification, carotid intima-media thickness (CIMT), and endothelial dysfunction rivaling that of the metabolic syndrome. Systemic Lupus Erythematosus may be considered analogous to the metabolic syndrome in its complex presentation and associated cardiovascular risk. Thus it warrants a similar rigor applied to early screening and treatment. The goal of therapy in SLE is to reduce both the individual and the combined risks of cardiovascular, cerebrovascular, and renal disease by aggressive disease-modifying and anti-inflammatory therapy.

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Submitted September 12, 2016