FREQUENCY OF CARDIAC ABNORMALITIES IN PATIENTS PRESENTING WITH SYSTEMIC LUPUS ERYTHEMATOSUS AT TERTIARY CARE HOSPITAL, KARACHI

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ABSTRACT

Objective: This study was aimed to assess the frequency of cardiac abnormalities in patients presenting with systemic lupus erythematosus at tertiary care hospital at Karachi.

Background: The classic autoimmune disease affecting several systems SLE (Systemic Lupus Erythematosus) comprises a wide spectrum of clinical symptoms and affects practically all organs and tissues. Cardiovascular system issues are frequently seen by patients with systemic lupus erythematosus (SLE). These patients' involvement of the pericardium, endocardium, myocardium, coronary, and pulmonary arteries was found throughout several clinical and postmortem investigations.

Materials and Methods: A cross sectional study was conducted at Department of Medicine, JPMC, and Karachi for six months from March to September 2021. We included 124 patients using the total population sampling technique from the Outpatient Department. SPSS Version 23 was used to analyze the data.

Results: The mean age of participants was 51.66 years (SD±6.49), mean duration of SLE and BMI were 3.72 months (SD±1.24), 28.41 kg/m^2 (SD ± 2.56), respectively. Out of 124 patients, 94 (75.8%) of the participants had urban residence. 57 (46%) participants had SLE for > 3 months, 18 (14.5%) were diabetic. The most common cardiac finding was pulmonary hypertension 50 (40.3%), followed by left ventricular dysfunction & hypertrophy 31 (25%) and right ventricular dysfunction & hypertrophy 30 (24.2%).

Conclusion: The majority of the patients experienced cardiac problems. Although all three layers of the heart may be damaged, however, endocardial damage was the frequent manifestation. Early diagnosis of echocardiographic abnormalities and diligent monitoring of cardiac abnormalities should be taken into consideration.

Keywords: SLE, cardiac abnormalities, Karachi, Pakistan

INTRODUCTION

The classic autoimmune disease affecting several systems SLE (Systemic Lupus Erythematosus) comprises a wide spectrum of clinical symptoms and affects practically all organs and tissues[1]. It can appear passive or progress all the way to fulminant. Immune complex deposits in various organs, which trigger complement and other inflammatory mediators, are the main cause of the disease in SLE.[2] cardiovascular system issues are frequently seen by patients with systemic lupus erythematosus (SLE). These patients' involvement of the pericardium, endocardium, myocardium, coronary, and pulmonary arteries was found throughout several clinical and postmortem investigations[3]. The current management recommendations for SLE advocate for the early identification and treatment of cardiovascular risk factors[4]. However, delays in the detection of cardiac involvement may be brought on by the vague and multivariate nature of symptoms like dyspnea and tiredness in SLE patients as well as the poor value of the clinical cardiac assessment[5].

Early identification of high-risk SLE patients is a challenge, and although risk factors for accelerated atherosclerosis are increasingly being identified, studies aiming to identify risk factors for other cardiac complications such as valvular dysfunction, pulmonary artery hypertension (PAH), pericardial disease or heart failure have provided conflicting results.[6] There are several predictors for development of pulmonary hypertension in SLE patients such as serositis (pleural effusion and pericardial effusion), Raynaud's phenomenon, nephritis and rheumatoid factor. [7-8]

Myocardial involvement in the course of systemic lupus erythematosus (SLE) is not uncommon. [9] Assessment of cardiac functions should be carried out in lupus patients who clinically present with arrhythmias, tachycardia, and dyspnea which considered a life-threatening manifestation of SLE Nonetheless, during the last decade, the application of sensitive imaging methods such as echocardiography has considerably augmented our understanding about the details of cardiac diseases in SLE. [10-11]As there is a dearth of local data, this study was carried out to assess the prevalence of cardiac anomalies in patients with systemic lupus erythematosus Cardiac abnormalities is an integral part of the systemic lupus erythematosus but are generally under recognized by the treating physician and under reported by the patients.

METHODS AND MATERIALS

A cross sectional study was conducted at Department of Medicine, JPMC, Karachi over a period of Six months from March 2021 to September 2021. We included 124 patients in the study using the total population sampling technique from the Outpatient Department of Medicine, JPMC, Karachi, who had a history of systemic lupus erythematosus and satisfied the inclusion criteria. Ethical approval was obtained from the institutional ethical review committee. All patients provided their informed consent. SPSS Version 23 was used to analyze the data. For continuous variables including age, height, weight, BMI, and the length of time with systemic lupus erythematosus, mean and standard deviation were determined. For categorical variables including gender, residency status, hypertension, diabetes mellitus type II, dyslipidemia, smoking status, obesity status, occupational status, and heart abnormalities, frequency and percentages were determined.

RESULT

In this study, it was observed that the mean age in our study was 51.66 years with the standard deviation of ±6.49. Whereas, mean duration of SLE, BMI, height and weight in our study was 3.72±1.24 months, 28.41±2.56 kg/m^2, 157.4

±7.28 cm and 76.3±9.87 kg respectively. As shown in Table 1.

Table I Descriptive Statistics in the Study

	Mean	Standard Deviation	Min	Max
Age (years)	51.66	±6.49	29	60
Weight (Kg)	76.3	±9.87	68-115	115
Height (cm)	157.4	±7.28	148-162	162
BMI (Kg/m2)	28.41	±2.56	23-33	33
Duration of SLE (Days)	3.72	±1.24	1.00	5

Out of 124 patients, 24 (19.4%) and 100 (80.6%) were male and female. Most of the participants 81 (65.3%) belonged to the age group 46-60. 94 (75.8%) of the participants had urban residence. 57 (46%) participants had SLE for > 3 months, 18 (14.5%) were diabetic, 35 (28.2%) were hypertensive, 30 (24.2%) had dyslipidemia, 12 (9.7%) were smoker, 36 (29%) had obesity, In this study, 71 (57.3%) participants unemployed. Table II.

Table II. Socio-Demographic Factors and Medical History of the Study Participants

Variable	Frequency	%
Gender		
Male	24	19.40%
Female	100	80.60%
Age Groups		
30 to 45	43	34.70%
46 to 60	81	65.30%
Residence		
Urban	94	75.80%
Rural	30	24.20%
Duration of SLE		
≤ 3 months	67	54.00%

> 3 months	57	46.00%
Diabetes Mellitus Type II		
Yes	18	15%
No	106	86%
Hypertension		
Yes	35	28.20%
No	89	71.80%
Dyslipidemia		
Yes	30	24.20%
No	94	75.80%
Smoking Status		
Yes	12	9.70%
No	112	90.30%
Obesity		
Yes	36	29%
No	88	-71%
Working Status		
Employed	53	42.70%
Unemployed	71	57.30%

In this study, the most common cardiac finding was pulmonary hypertension 50 (40.3%), followed by left ventricular dysfunction & hypertrophy 31 (25%) and right ventricular dysfunction & hypertrophy 30 (24.2%). While pulmonary stenosis and regurgitation were the least 06 (4.8%) observed findings. Table III

Table III. Cardiac Diseases among SLE patients

Cardiac Disease	YES	NO
Pulmonary Hypertension:	50 (40.3%)	74 (59.7%)
Pericardial Effusion:	20 (16.1%)	104 (83.9%)
Valvular involvement:		
Mitral stenosis.	18 (14.5%)	106 (85.5%)
Mitral regurgitation.	13 (10.5%)	111 (89.5%)
Tricuspid stenosis.	13 (10.5%)	111 (89.5%)
Tricuspid regurgitation.	13 (10.5%)	111 (89.5%)
Aortic stenosis.	24 (19.4%)	100 (80.6%)
Aortic regurgitation.	18 (14.5%)	106 (85.5%)
Pulmonary stenosis.	06 (4.8%)	118 (95.2%)
Pulmonary regurgitation.	06 (4.8%)	118 (95.2%)
Dysfunction:		
Right ventricular dysfunction.	30 (24.2%)	94 (75.8%)

Left ventricular dysfunction	31 (25%)	93 (75%)
Hypertrophy:		
Right ventricular hypertrophy.	30 (24.2%)	94 (75.8%)
Left ventricular hypertrophy.	31 (25%)	93 (75%)

DISCUSSION

SLE is a condition that can affect people of various ages, ethnicities, and sexes, however more than 90% of new patients who come with SLE are women who are in their reproductive years. Multiple systems are affected by SLE, which is a disease. Various symptoms of SLE exist. In SLE, fatigue is likely multifactorial and has been linked to conditions other than the illness itself or its symptoms, such anaemia or hypothyroidism. Multisystemic microvascular inflammation and the production of many autoantibodies, especially antinuclear antibodies, are features of the autoimmune disease SLE (ANA). [6,7]

Pericardium, myocardium, and endocardium can all be impacted by cardiac involvement in SLE. According to estimates, 25% of SLE patients will experience pericarditis at the time of the disease's beginning or during relapses. Up to 40% of cases of pericardial effusion without symptoms have been documented. Although myocarditis is uncommon, it can cause heart failure, dilated cardiomyopathy, ventricular dysfunction, and arrhythmias. According to some studies, Libman-Sacks endocarditis affects 1 in 10 individuals and is identified by verrucous development on the valve leaflets, papillary muscles, and endocardium. SLE has also been linked to valvular thickness, vegetations, and dysfunction, with the tricuspid valve being often affected.[8.9]

According to another study, the average patient age was 31.3 10.5 years, and the average length of the condition was 5.18 4.1 years. The majority of patients—86.4%—were female. By echocardiography, the most common cardiac manifestations were, in order of frequency, pulmonary hypertension (8.5%), mitral regurgitation (33.9%), tricuspid regurgitation (32.2%), mitral thickness (18.6%), aortic thickening (13.6%), and pericardial effusion (13.6%). Peaks were seen with renal disease, MetS, and leukopenia when comparing the prevalence of various echocardiographic abnormalities to other clinical characteristics. Components of MetS (triglycerides, high systolic blood pressure) and avascular necrosis were significant predictors for pericardial diseases (OR=1.011 CI 95% 1-1.022, p=0.046, OR=1.157 CI 95% 1.025-1.307, p=0.018, and OR=74.78 CI 95% 2.52-2215.76, p=0.013, respectively), and it is likely that hydroxychloroquine was protective against them. Age of the patients was a significant predictor for tricuspid regurgitation (OR=1.063 CI 95% 1.004-1.126, p=0.036). Mucosal ulcers were negative predictors for mitral thickening and regurgitation (OR=0.2 CI 95% 0.059-0.673, p=0.009). The use of corticosteroids appeared to protect against a number of valve lesions especially tricuspid regurgitation (OR=0.299 CI 95% 0.088-1.019, p=0.054). [10]

It is typical for SLE to affect the heart. On average, pericarditis, LSE, myocarditis, coronary artery disease, pulmonary arterial hypertension are thought to be present in more than 50% of SLE patients[11]. In this study, the most common cardiac finding was pulmonary hypertension 50 (40.3%), followed by left ventricular dysfunction & hypertrophy 31 (25%) and right ventricular dysfunction & hypertrophy 30 (24.2%). While studying

cardiac manifestations, Chen PY et al reported that pericardial effusion (63%) and mitral regurgitation (63%) followed by impairment of left ventricular systolic function (25%) and tricuspid regurgitation (13%)[12]. In another study, three types of cardiac abnormalities were identified. Pericardial effusion or thickening affected 20% of cases, and regional or global left ventricular dysfunction, affected 5% of cases. Valvular lesions, which range from vegetations to valvular thickening, were found in 28% of cases. 50 individuals (54%) with SLE had high levels of anticardiolipin antibodies, according to one study[13]. Mohamed et al observed that cardiac presentations by echocardiography were mainly mitral regurgitation (33.9%), tricuspid regurgitation (32.2%), mitral thickening (18.6%), aortic thickening (13.6%), pericardial effusion (13.6%), and pulmonary hypertension (8.5%) in order of frequency[14].

Pulmonary arterial hypertension is a serious and devastating complication of systemic lupus erythematosus (SLE), especially when the right ventricle (RV) fails[15]. In the present study, the most common cardiac finding was pulmonary hypertension 50 (40.3%), however, pulmonary hypertension was reported only 8.5% in a study[14]. The frequency of occurrence of echocardiographic abnormalities in this study tends to be in contrast to other previous observations with the mitral and tricuspid valve involvement being the most frequent, while myocardial dysfunction compared to our study pulmonary hypertension was 40.3%.

In this study pulmonary stenosis and regurgitation were the least 06 (4.8%) observed findings. Likewise our study, pulmonary stenosis and regurgitation were less frequent in observation reported by Mohamed et al [14]. Consistent with our findings, cardiac manifestations were reported to present with diabetes and dyslipidemia also [16]. Compared to our observations, reasonably higher figures were reported by Zaid FE et al that cardiovascular disease was observed in 47% of patients with systemic lupus erythematosus. Myocarditis and pulmonary hypertension are most frequent [17]. 50 SLE patients were sequentially included in an analytical cross-sectional investigation. Transthoracic 2D, colour, and tissue Doppler imaging echocardiography was performed on the patients. Nine patients (18%) had a diagnosis of left ventricular (LV) systolic dysfunction, while eight (16%) had LV diastolic dysfunction. The most prevalent valve illness, tricuspid regurgitation (TR), was identified in 29 (58%) of the patients, followed by mitral regurgitation (MR), which was seen in 27 (54%) of the patients. Six (12%) of the patients demonstrated aberrant regional wall motion. In 25 individuals (about 50%), pulmonary artery hypertension was present. [18]

CONCLUSIONS

The majority of the patients experienced cardiac problems, which are more dangerous and have a higher fatality rate. Although all three layers of the heart may be damaged, SLE patients most frequently have endocardial damage. Early diagnosis of echocardiographic abnormalities and diligent monitoring of cardiac abnormalities should be taken into consideration, especially in individuals with known risk factors, such as steroid usage. It concluded that SLE disease activity, chronic inflammation, genetic susceptibility, and unfavourable treatment effects are key roles in the pathophysiology of cardiac involvement.

RECOMMENDATIONS

Various factors, including the degree of inflammation, the diagnostic method utilised, the adverse effects of the medication used, and many others, may affect the frequency and kind of cardiac involvements.

These days, echocardiography and non-invasive testing can quickly and readily identify minor cardiac symptoms. They may require specialised therapy and may affect disability and long-term results. Additionally, based on the data from this investigation, a successful management strategy will be created to control them.

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CONFLICT OF INTEREST

Authors declared no any conflict of interest.

AUTHOR'S CONTRIBUTION

FA and AQ collected the data, MPS analyzed the data, SR and AAB drafted the manuscript and HAA critically analyzed the draft.

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