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# Cardiac manifestations in cases with systemic lupus erythematosus: A prospective study

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**Abstract**
Cardiovascular complications are common cause of mortality on cases with systemic lupus erythematosus (SLE). Both idiopathic and drug induced lupus have cardiac manifestations. The present study was designed to evaluate cardiovascular manifestations in cases with systemic lupus erythematosus. A total of 64 clinically and serologically diagnosed cases of systemic lupus erythematosus above 21 years of age were recruited. Clinical and serological examination was performed to assess the study participants. All the cases were subjected to ECG and chest X-ray and later were subjected to echocardiography to assess all the cardiac features. Majority cases were in between 21-30 years (32.1%) followed by 31-40 years (28.1%). 54.68% cases had disease >5 years and 45.31% cases had disease <5 years. 46.87% cases had oral and nasal ulcers, followed by chest pain (37.5%), dyspnoea (31.25%), photosensitivity (17.1%), Raynaud phenomenon (17.1%), arthralgia (15.6%), palpitations (15.6%), seizures (12.5%), syncope (10.9%) and myalgia (7.81%). Echo findings showed that 6 cases had systolic dysfunction, 4 cases had diastolic dysfunction, 7 cases had regional hypokinesia, 6 cases had global hypokinesia, 22 cases had pericardial effusion, 4 cases had pericardial thickening, 10 cases had mitral valve prolapse syndrome, 1 case had mitral stenosis, 16 cases had mitral regurgitation, 9 cases had aortic thickening, 6 cases had aortic regurgitation, 10 cases had tricuspid regurgitation, 11 cases had pulmonary hypertension and 1 case had pulmonary stenosis. Pericarditis and pericardial effusion was the most common cardiovascular manifestation and global hypokinesia was least common cardiac manifestation.

**Keywords:** Systemic lupus erythematosus (SLE), cardiac abnormalities, echocardiography

## Introduction
Systemic lupus erythematosus (SLE) is a chronic autoimmune disease with complex pathophysiology, which is characterized by inflammation and damage to multiple organ systems [1]. Studies have been suggested that cardiovascular involvement was observed over 50% of cases with systemic lupus erythematosus and is the third most common cause of mortality [2].

Cardiovascular complications such as pericarditis and pericardial effusion are commonly associated with SLE. Cardiac complications may involve endocardium, myocardium and pericardium and may be responsible for fatal outcome [3]. Valvular heart diseases are the second most common complications associated with SLE such as prolapsed mitral valve, mitral regurgitation, mitral stenosis, aortic thickening and aortic regurgitation [4]. Cardiovascular events are proportionally higher in SLE compared to general populations of comparable age and sex [5]. Cardiac abnormalities are associated with positive anti double standard DNA in lupus cases [6]. The detailed pathologic mechanism of SLE is still controvertible. The present study was designed to evaluate clinical, laboratory and therapeutic profiles of the cases in order to characterize the risks of cardiovascular manifestations in systemic lupus erythematosus.

## Materials and Methods
The present prospective study was conducted in the Department of General Medicine in association with Department of Dermatology at MNR Medical College and Hospital, Sangareddy from August 2019 to October 2020. A total of 64 clinically and serologically diagnosed cases of systemic lupus erythematosus above 21 years of age were recruited. The written informed consent was obtained from all the study participants and the study protocol was approved by the institutional ethics committee. Cases fulfilling systemic lupus international collaborating clinics classification criteria for SLE and willing to participate

were included. Cases with associated autoimmune disease like rheumatoid arthritis and other systemic complications like hypertension, cardiovascular complications, diabetes mellitus and not willing to participate in the study were excluded.

All the study participants were undergone to detailed physical and cardiovascular examination. Routine laboratory investigations i.e. erythrocyte sedimentation rate, full blood cell count, fasting blood glucose and urine analysis were performed. Anti dsDNA was performed for all the study participants by enzyme linked immunosorbent assay. All the cases were subjected to ECG and chest X-ray and later were subjected to echocardiography to assess all the cardiac features. The SPSS version 23 software was used to carry out statistical analysis relevant to the study. The frequency and percentage (%) were calculated for cardiac manifestations in patients with SLE. The chi-square test was used to compare the variables and *p*-value of <0.05 was considered statistically significant

## Results

**Table 1:** Demographic details of cases with systemic lupus erythematosus

| Parameter | Number | Percentage |
|---|---|---|
| **Age (In years)** | | |
| 21-30 | 21 | 32.8% |
| 31-40 | 18 | 28.1% |
| 41-50 | 13 | 20.3% |
| 51-60 | 10 | 15.6% |
| >60 | 02 | 3.12% |
| **Gender** | | |
| Male | 26 | 40.62% |
| Female | 38 | 59.37% |
| **Disease duration (In years)** | | |
| <5 years | 29 | 45.31% |
| >5 years | 35 | 54.68% |

**Table 2:** Clinical profile of the study participants

| | Number | Percentage |
|---|---|---|
| **Pulse rate** | | |
| ≤ 100 | 18 | 28.12% |
| ≥ 100 | 46 | 71.87% |
| **Blood pressure** | | |
| ≤ 140/80 | 41 | 64.06% |
| ≥ 140/80 | 23 | 35.93% |
| **Clinical symptoms** | | |
| **Mucocutaneous symptoms** | | |
| Oral and nasal ulcers | 30 | 46.87% |
| **Musculoskeletal symptoms** | | |
| Arthralgia | 10 | 15.6% |
| Myalgia | 05 | 7.81% |
| **Other symptoms** | | |
| Dyspnoea | 20 | 31.25% |
| Chest pain | 24 | 37.5% |
| Palpitations | 10 | 15.6% |
| Syncope | 07 | 10.9% |
| Photosensitivity | 11 | 17.1% |
| Seizures | 08 | 12.5% |
| Raynaud phenomenon | 11 | 17.1% |
| **Clinical signs** | | |
| Arthritis | 09 | 14.06% |
| A2 | 01 | 1.56% |
| P2 | 10 | 15.6% |
| S3 | 04 | 6.25% |
| Malar rash | 29 | 45.31% |
| Elevated JVP | 18 | 28.12% |
| Pericardial rub | 14 | 21.87% |

**Table 3:** Profile of laboratory findings in the study participants

| Parameter | Number | Percentage |
|---|---|---|
| **Anti-nuclear antibody** | | |
| +Ve | 59 | 92.18% |
| -Ve | 05 | 7.81% |
| **Anti-ds-DNA** | | |
| +Ve | 62 | 96.87% |
| -Ve | 02 | 3.12% |
| **24 hrs. urinary protein** | | |
| <500 | 07 | 10.93% |
| 500-1000 | 43 | 67.18% |
| >1000 | 14 | 21.8% |
| ESR (1 hr.) | 35 | |
| LDL (g/dl) | 82 | |
| HDL (g/dl) | 49 | |
| TG (g/dl) | 95 | |
| Cholesterol (g/dl) | 156 | |

**Table 4:** Echocardiographic features in the study participants

| Findings | > 5 years | < 5 years | *P*-value |
|---|---|---|---|
| Systolic dysfunction | 03 | 03 | 0.642 |
| Diastolic dysfunction | 00 | 04 | 0.185 |
| Regional hypokinesia | 04 | 03 | 0.238 |
| Global hypokinesia | 04 | 02 | 0.326 |
| Pericardial effusion | 10 | 12 | 0.218 |
| Pericardial thickening | 03 | 01 | 0.512 |
| Mitral valve prolapse syndrome | 04 | 06 | 0.338 |
| Mitral stenosis | 00 | 01 | 0.155 |
| Mitral regurgitation | 05 | 11 | 0.546 |
| Aortic stenosis | 00 | 00 | - |
| Aortic thickening | 04 | 05 | 0.682 |
| Aortic regurgitation | 01 | 05 | 0.287 |
| Tricuspid regurgitation | 05 | 05 | 0.632 |
| Tricuspid stenosis | 00 | 00 | - |
| Pulmonary hypertension | 04 | 07 | 0.446 |
| Pulmonary stenosis | 00 | 01 | 0.233 |

## Discussion

Systemic lupus erythematosus (SLE) is an autoimmune disorder which affects multiple organ systems with a complex pathophysiology [7]. The diagnostic criteria of SLE have been revised in to order to increase diagnostic accuracy, where the presence of four or more clinical and laboratory criteria defines SLE [8]. The present study was designed to evaluate cardiovascular manifestations in cases with systemic lupus erythematosus. A total of 64 cases clinically and serologically diagnosed with SPE were recruited. Majority cases were in between 21-30 years (32.1%) followed by 31-40 years (28.1%) and 41-50 years (20.3%). Female (59.37%) participants were more than the male (40.62%) participants. 54.68% cases had disease more than 5 years and 45.31% cases had disease less than 5 years (Table 1). Alaa AA Mohamed *et al*. in his study noticed mean age 31.3 years with female predominance (86.4%). The mean disease duration was 5.18 years [9].

In the present study, 71.87% cases had pulse rate >100 and 28.12% cases had pulse rate <100. 64.06% cases had blood pressure <140/80 and 35.93% cases had blood pressure >140/80. In related to clinical symptoms, 46.87% cases had oral and nasal ulcers, followed by chest pain (37.5%), dyspnoea (31.25%), photosensitivity (17.1%), Raynaud phenomenon (17.1%), arthralgia (15.6%), palpitations (15.6%), seizures (12.5%), syncope (10.9%) and myalgia (7.81%) (Table 2). A study by Alaa AA Mohamed *et al*. noticed that 3.4% cases had seizures, 33.9% cases had

arthritis, 20.3% cases had myalgia and 50.8% cases had oral and nasal ulcers [9]. A study by Nahla Mohamad Gaballah *et al*. found female predominance in both the study groups i.e. with cardiac manifestations and without cardiac affection. In group 1 (with cardiac affection), 70.6% cases had arthralgia, 17.6% cases had arthritis, 76.4% cases had photosensitivity, 76.4% cases had oral ulcers and 23.5% cases had Raynaud's phenomena. In group 2 (Without cardiac affection), 37.5% cases had arthralgia, 62.5% cases had arthritis, 100% cases had photosensitivity, 75% cases had oral ulcers and 37.5% cases had Raynaud's phenomena [10].

The details of laboratory findings showed the ESR was 35, LDL was 82g/dl, HDL was 49g/dl, TG was 95g/dl and cholesterol was 156g/dl. The urine analysis showed that 24 hours urinary protein was <500 in 10.93% cases, 500-1000 in 67.18% cases and >1000 in 21.8% cases. In this study, anti dsDNA antibody was positive in 96.87% cases. Alaa AA Mohamed et al. in their study found ESR was 34, cholesterol 153g/dl, LDL was 85g/dl, HDL 51g/dl and TG 95g/dl [9]. A study by Nahla Mohamad Gaballah *et al*. found significant difference in laboratory findings between two study groups as regards to anaemia, ESR anti DNA and lupus anti-coagulant. But the lipogram findings didn't show ant statistical significant difference between both groups ($p$>0.05) [10]. A study by Shahid Hameed *et al*. found anti double standard DNA antibody positive in 71% cases with cardiac abnormalities [11].

Among the study participants, 14 cases had normal findings on echocardiography. 6 cases had systolic dysfunction, 4 cases had diastolic dysfunction, 7 cases had regional hypokinesia, 6 cases had global hypokinesia, 22 cases had pericardial effusion, 4 cases had pericardial thickening, 10 cases had mitral valve prolapse syndrome, 1 case had mitral stenosis, 16 cases had mitral regurgitation, 9 cases had aortic thickening, 6 cases had aortic regurgitation, 10 cases had tricuspid regurgitation, 11 cases had pulmonary hypertension and 1 case had pulmonary stenosis (Table 4). Alaa AA Mohamed et al. in their study noticed pericardial thickening in 6.8% cases, pericardial effusion in 13.6% cases, mitral thickening in 18.6% case, mitral stenosis in 1.7% cases, mitral regurgitation in 33.9% cases, aortic thickening in 13.6% cases, aortic regurgitation in 6.8% cases, tricuspid thickening in 1.7% cases, pulmonary stenosis in 1.7% cases and pulmonary regurgitation in 5.1% cases [9]. A study by Nahla Mohamad Gaballah *et al*. found mitral regurgitation in 44% cases, aortic valve regurgitation in 24% cases and tricuspid regurgitation in 16% cases [10].

## Conclusion

Pericarditis and pericardial effusion was the most common cardiovascular manifestation and global hypokinesia was least common cardiac manifestation. The study cases were responded well to corticosteroids therapeutics. Corticosteroids were protective against valve lesions such as tricuspid regurgitation and aortic thickening.

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