

A STUDY OF PULMONARY MANIFESTATIONS IN SYSTEMIC LUPUS ERYTHEMATOSUS

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ABSTRACT

BACKGROUND

Systemic Lupus Erythematosus (SLE) is a multisystem disease that is caused by tissue damage resulting from antibody and complement-fixing immune complex deposition. There is a wide spectrum of clinical presentations, which are characterised by remissions and exacerbation.

Aims and Objectives- To study the pleuropulmonary involvement in SLE patients by clinical examinations and investigations including Chest X-ray, High Resolution Computerised Tomography (HRCT) and Pulmonary Function Test (PFT).

MATERIALS AND METHODS

This is a descriptive case series study of 40 patients with SLE. By using IBM SPSS statistical software Version 20.0, the Non-parametric Fisher Exact test was used to determine the association between HRCT and other variables for SLE Patients.

RESULTS

There were a total of 40 patients all of whom were women. The age distribution was 13-42 years [Figure 1]. The duration of illness was between 3 months – 10 years. The symptom analysis revealed 45% had symptoms like pleuritic pain, cough with or without breathlessness [Figure 2]. There is an association between HRCT, Respiratory symptoms, X-ray findings and PFT findings.

CONCLUSION

1. Pulmonary manifestations are common in SLE patients with frequency of involvement being 65%, which is higher than that reported in an Indian Study – 9 to 54% (API 2003 7th edn.). 2. Pleurisy was the most common pulmonary manifestation in SLE (45%). 3. Pneumonitis secondary to infections were the second common pulmonary manifestation (20%). 4. ILD was the third common pulmonary manifestation in our study (15%). It was previously believed that ILD was common in scleroderma and rheumatoid arthritis and low in SLE due to inadequate screening technique like chest x-ray. In studies utilising HRCT, 38% of 45 SLE patients with normal chest radiographs demonstrated pulmonary abnormalities consistent with some form of ILD. This concluded that HRCT was the sensitive procedure to find out pulmonary changes. 5. Pulmonary nodules were also found in 10% of Patients. Presence of uraemia is attributed in 1 case and in the other case no detectable cause could be found. 6. PFT in SLE patients is insensitive and nonspecific than HRCT in detecting pulmonary changes.

KEYWORDS

Systemic Lupus Erythematosus, Pulmonary Manifestations, HRCT.

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BACKGROUND

Systemic Lupus Erythematosus (SLE) is a multisystem disease that is caused by tissue damage resulting from antibody and complement-fixing immune complex deposition. There is a wide spectrum of clinical presentations, which are characterised by remissions and exacerbations.

Prevalence

The prevalence of SLE in United States varies from 14.6 to 50.8 per 100,000 populations. It is more common in blacks than in whites. In a study conducted near Delhi, the prevalence of SLE was found to be 3.2 per 100,000 populations, the lowest in the world. (API-2003, 7th Ed.)

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Age and Sex

90% cases are in women usually of childbearing age. Female to Male ratio is 7 to 9:1 in women of child bearing years. Female to male ratio in premenopausal and postmenopausal year is 3:1. The children, men, elderly can be affected. The highest incidence is seen between 20 to 50 years of age.

Aim and Objective

To study the pleuropulmonary involvement in SLE patients by clinical examinations and investigations including chest X-ray, High Resolution Computerised Tomography (HRCT) and Pulmonary Function Test (PFT).

MATERIALS AND METHODS.

This is a descriptive case series study of 40 patients with SLE. By using IBM SPSS statistical software Version 20.0, the Non-parametric Fisher Exact test was used to determine the association between HRCT and other variables for SLE Patients.

Selection of Patients

A total of 40 patients who were diagnosed as SLE in Government Villupuram Medical College Hospital from May 2015 to April 2016 were admitted and evaluated in General Medicine Department of GVMCH, Villupuram for this study.

Inclusion Criteria

All the patients who satisfied the 4 out of 11 criteria for classification of SLE by American College of Rheumatology 1997 and were included in the study.

Exclusion Criteria

Patients who gave history of chronic obstructive pulmonary disease, nicotine abuse and industrial exposure were excluded from the study.

Evaluation of Patients

Symptoms related to respiratory system such as cough with or without expectoration, haemoptysis, pleuritic chest pain and breathlessness were recorded.

Investigations

Biochemical and haematological tests including complete blood count, urine for albumin and deposits, blood sugar, blood urea and serum creatinine were done. ANA estimation by indirect immunofluorescence assay using Hep-2 cells substrate was already done in all the cases and the results were recorded. X-ray chest and ECG was taken for all the patients.

All 40 patients were subjected to pulmonary function tests followed by HRCT scan. PFT was done to assess normal restrictive or obstructive pattern. HRCT was done to identify and assess pleural and or parenchymal involvement. Sputum culture for bacteria and TB bacilli and Sputum for AFB were done in relevant cases.

RESULTS

There were a total of 40 patients all of whom were women. The age distribution was 13-42 years [Figure 1]. The duration of illness was between 3 months – 10 years. The symptom analysis revealed 45% had symptoms like pleuritic pain, cough with or without breathlessness [Figure 2]. By using Fisher exact test there is association between Respiratory symptoms and HRCT, the association between X-Ray and HRCT and PFT [Table 1].

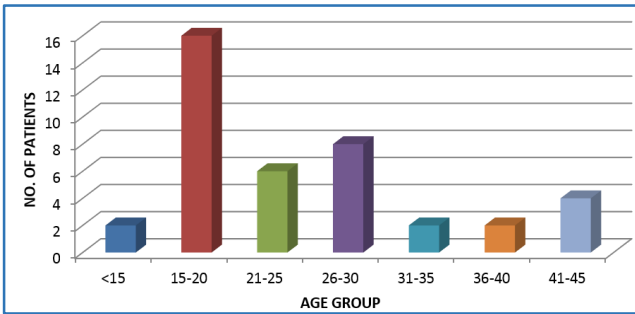


Figure 1. Age Distribution of Systemic Lupus Erythematosus

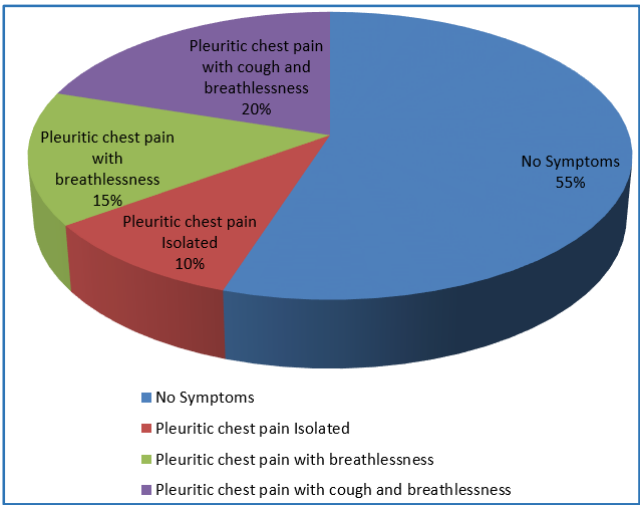


Figure 2. Respiratory Symptoms of Systemic Lupus Erythematosus

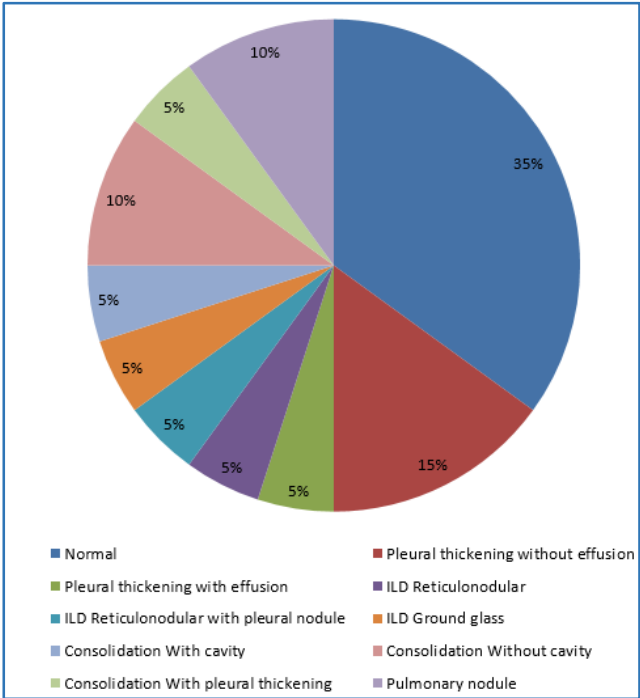


Figure 3. High Resolution Computerised Tomography Scan Results of Systemic Lupus Erythematosus

		No. of Patients with Pleuro-Pulmonary Involvement in HRCT	No. of Patients without Pleuro-Pulmonary Involvement on HRCT	Fisher Exact Test Statistic
Respiratory Symptoms	No Symptoms	8	14	0.00002
	With Symptoms	18	0	
Chest X-Ray	Normal Study	14	14	0.00272.
	Abnormal Study	12	-	
PFT Findings	Normal	12	14	0.000458
	Abnormal	14	-	

Table 1. Association of Respiratory Symptoms, X Ray Chest, PFT Findings with HRCT Changes

DISCUSSION

Out of 40 patients, all patients were females.

Age Distribution

The highest incidence of SLE was between 20 to 50 years of age (API 2003 7thedn.). In our study, age group ranged from 13 to 42 years. The maximum distribution of patients was between 15 to 20 years (12/30) and the next between 26 to 30 years (6/30).

Initial Manifestations

Dubois and Tuffanelli reported 46% of their 520 patients had arthralgia and arthritis as initial manifestations.^{1,2,3}

Similarly, Arthralgia and Arthritis were the Initial Symptoms in following Series of Studies-

1. Harvey et al (47% of 105 cases).⁴
2. Hasterick et al (55% of 275 cases).
3. Larsen et al (59% of 200 cases).⁵

In our study, 70% of patients (23/30) had initial manifestation as arthralgia and arthritis.

Symptoms

Respiratory symptoms like cough, pleuritic chest pain, breathlessness were present in 18 patients (45%) and the remaining 22 patients (55%) were asymptomatic.

Chest Radiograph Findings

Chest radiographs were abnormal in only 12 patients out of 40 patients. Patchy infiltration in mid zones on both sides was found in 4, diffuse nonhomogeneous opacity in left upper zone and both lower zones in 3, homogenous opacity in right mid zone in 2, and patchy infiltration in both mid and lower zones in 3 patients.

PFT and HRCT Findings

In PFT, normal pattern was seen in 26 patients (65%), restrictive pattern in 10 patients (25%) and obstructive pattern in only 4 patients (10%).

In HRCT, 6 patients had bilateral pleural thickening without effusion, 2 patients had bilateral pleural thickening with bilateral minimal pleural effusion and another 2 patients had bilateral pleural thickening with consolidation. ILD was seen in 6 patients (ground glass appearance in 2, reticulonodular pattern in 2, reticulonodular with pleural nodule in 2 patients), Consolidation in 6 patients (isolated consolidation in 4, consolidation with cavity in 2) and pulmonary nodule in 4 patients [Figure 3].

Comparison of X-Ray and HRCT Findings

All 12 patients with abnormal X-ray findings had abnormality in HRCT scan. HRCT was also abnormal in 14 patients in whom X-ray was normal. This shows that HRCT is more sensitive in detecting the pulmonary manifestations than chest x-ray, which was found to be a relatively insensitive technique [p value <0.05].

Comparison of PFT and HRCT Findings

All 14 patients with abnormal PFT had abnormality in HRCT scan. HRCT was also abnormal in 12 patients in whom PFT was normal. This shows that PFT is insensitive in detecting pulmonary changes than HRCT [p value <0.05].

Pleurisy and Pleural Effusion

Pleurisy was the most common manifestation of respiratory involvement in SLE.

Harvey et al reported 56% of patients had pleurisy and 16% had associated pleural effusion.⁴

Dubois and Tuffanelli noted 45% of their 520 patients had pleuritic chest pain and 30% had pleural effusion.³

Estes and Christian reported 48% of 140 patients had pleurisy and 40% had pleural effusion.⁶

Fries and Holman noted 31% of 193 cases had pleurisy and 10% had pleural effusion.⁷

In our study, 45% of patients (18/40) had pleuritic chest pain.

Pneumonitis and Pulmonary Nodules

In Estes and Christian series of 150 patients, 48% had evidence of pulmonary involvement at some time during the course of their illness but only 14 (9.3%) had acute lupus pneumonitis.⁶ Bulgrin et al reported that 3 of 207 patients (1.4%) developed acute lupus pneumonitis.⁸ Levin found that 3 of 111 patients (2.7%) with SLE had lupus pneumonitis.⁹

In retrospective studies of 111 patients with SLE, Levin found that radiographic parenchymal changes (infiltrate and small nodules) mostly were the results of secondary complications such as infections, uremic pulmonary oedema and basilar atelectasis.⁹ Levin reported 15% to 50% patients had various types of pulmonary lesions.

In our studies, 8 patients (20%) out of 40 had consolidation. Among them, 2 patients were positive for AFB on smear examination and sputum culture. In remaining 6 patients, Klebsiella was grown in sputum culture in 3 patients and Staphylococcus aureus in 3 patients.

Pulmonary nodules in both lung fields were found in HRCT scan in 4 patients (10%) who had no symptoms or signs. One patient had uraemia and in other patients no case with nodule was found. No case of Acute Lupus pneumonitis was found.

Interstitial Lung Disease

Eisenbreg et al calculated that the prevalence of ILD is 3% of SLE patients. In retrospective study of 63 patients with SLE Boulware and Hedgperth, looking for interstitial pneumonitis found 16 patients (25.4%) with ILD.¹⁰

In our study, 6 out of 40 patients (15%) had ILD in HRCT. The ground glass pattern was seen in two patients and reticulonodular changes in other two. Pleural nodule was associated in two patients with reticulonodular changes.

CONCLUSION

1. Pulmonary manifestations are common in SLE patients with frequency of involvement being 65%, which is higher than that reported in an Indian Study – 9 to 54% (API 2003 7thedn.).
2. Pleurisy was the most common pulmonary manifestation in SLE (45%).
3. Pneumonitis secondary to infections were the second common pulmonary manifestation (20%).
4. ILD was the third common pulmonary manifestation in our study (15%). It was previously believed that ILD was common in scleroderma and rheumatoid arthritis and low in SLE due to inadequate screening technique like chest x-ray. In studies utilising HRCT, 38% of 45 SLE

patients with normal chest radiographs demonstrated pulmonary abnormalities consistent with some form of ILD. This concluded that HRCT was the sensitive procedure to find out pulmonary changes.

5. Pulmonary nodules were also found in 10% of Patients. Presence of uraemia is attributed in 1 case and in the other case no detectable cause could be found.
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