

# PULMONARY FUNCTION IN SYSTEMIC LUPUS ERYTHEMATOUS

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## SYNOPSIS

**A study of the lung function in 19 patients with established systemic lupus erythematosus is reported. The lung volume determinations showed a restrictive defect in spite of the fact that the majority of patients had a normal chest radiograph. Impairment of diffusing capacity of the lung was a characteristic finding. This suggests that widespread pathological changes may be occurring in the areas of the lung and are too small to cast a radiographic shadow. A disparity between the clinical and roentgenological findings and the abnormalities of pulmonary function was noted.**

## INTRODUCTION

It has been appreciated that dyspnoea can occur in systemic lupus erythematosus even in those without obvious pleural and radiological change and often when there is radiological change.

The aim of the present study was to determine the incidence of abnormal lung function results and radiological abnormalities in a group of 19 patients with characteristic systemic lupus erythematosus.

## PATIENTS

We studied the ventilatory function and the chest radiographs of 19 patients seen at the Tan Tock Seng Hospital with a diagnosis of systemic lupus erythematosus. All the patients were female and there were no males in this group. The ages ranged from 16 to 41 years (mean 26.9 years). Seventeen out of the 19 patients had skin manifestations. The next most frequent manifestation was of joint involvement followed by renal involvement. The duration of the disease was from two weeks to four years. Two had dyspnoea on exertion. Twelve patients had a normal chest radiograph. Two patients had inactive tuberculous lesions present. A small pleural effusion was present in 1; cardiomegaly was present in 2; 2 patients had a prominent pulmonary artery and increased linear shadowing was present in the right lung base in one patient. Plate atelectasis and localized infiltrates were not observed.

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**METHODS**

The lung function measurements consisted of tests of ventilatory capacity, measurements of static lung volumes and resting transfer factor by the steady-state end-tidal sampling method. Blood gas analyses were performed with the Astrup apparatus and a reflection oximeter. The predicted normal values are from data obtained in the same laboratory and published previously (Poh and Chia 1969).

Tests of pulmonary function were carried out before starting treatment in 4 patients. The rest had their tests done soon after treatment was commenced.

**RESULTS**

The observed data for the 19 patients as a whole are compared with the predicted values. The lung volume determinations showed the characteristics of a "restrictive" pattern. The vital capacity although decreased did not reach statistical significance. The total lung capacity (TLC) was diminished as was the maximum mid-expiratory flow rates. It is possible that these patients had a superimposed airway obstruction as well. The mean arterial oxygen tension was 88.8 mm Hg.

The diffusing capacity of the lung was decreased below predicted normal values in all the patients. The mean steady-state end-tidal diffusing capacity of the lung for carbon monoxide was 8.5 ml/min/mm Hg (range 7.2 to 14.5 ml/mm Hg). Although the diffusing capacity may be influenced by interstitial thickening, we believe the reduction of the diffusing capacity of the lung to be related to a loss of surface area.

**DISCUSSION**

The more common features of patient with systemic lupus erythematosus and having pleuropulmonary changes are:

- 1) pleural involvement which appears as a thickening of the pleural surface;
- 2) unilateral or bilateral small pleural effusions;
- 3) unilaterally elevated diaphragms;
- 4) cardiomegaly;
- 5) plate-like atelectasis above the diaphragm;
- 6) diffuse interstitial pulmonary disease.

The incidence of diffuse interstitial pulmonary disease in systemic lupus erythematosus is unknown (Eisenberg, Dubois and Balchum, 1973). In his series pulmonary symptoms such as dyspnoea was observed in all the patients and in all of his patients there were diffuse pulmonary interstitial infiltrates that were linear and reticulonodular in appearance. In our series only one patient had increased shadowing in the right lung base. In spite of the fact that the majority of patients were on steroid treatment and had absence of radiological change in the lungfields the lung function tests were abnormal (Table 1). These findings agree with those of a

TABLE 1: Mean Values (and Standard Deviations) for predicted normal and patients

		Lung Function Measurements				
	No.	VC (L)	RV (L)	TLC (L)	MMFR (L/sec)	TF (ML/min mm Hg)
Predicted normal	19	2.58 (0.25)	1.23 (0.1)	3.82 (0.35)	3.53 (0.30)	17.8 (1.97)
Patients	19	2.44 (0.45)	1.00 (0.2)	3.44 (0.43)	3.00 (0.65)	9.8 (3.9)
		NS	p<0.01	p<0.01	p<0.01	p<0.001

series by Huang, Heningar and Lyons. These workers found a poor relationship between the presence or absence of clinical and roentgenologic findings and pulmonary function. Indeed two thirds of their patients were free of clinical or radiological findings in the lungs and yet showed abnormalities of pulmonary function. This suggests that widespread pathological changes may be occurring in the areas of the lung too small to cast a radiographic shadow. Lung biopsies were not carried out in our patients, however, in some reports the histological changes include epithelial hyperplasia, thickening of alveolar walls of fibrous tissue with interstitial infiltrate of chronic inflammatory cells. Vascular lesions such as arteritis, thrombi and thickening of the capillary walls in the lungs have been described.

**REFERENCES**

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