



A STUDY OF PREVALENCE OF PULMONARY MAIFESTATIONS IN CONNECTIVE TISSUE DISORDERS

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ABSTRACT

Introduction: Connective tissue diseases contain a heterogenous group of autoimmune disorders characterized by presence of autoantibodies. ILDs are the most common pulmonary complications of CTDs. **Aims & Objectives:** To study the pleuropulmonary manifestations in clinically and immunologically proven cases of Connective tissue disorders. **Material & Methods:** A prospective cross - sectional study with 53 Patients clinically and immunologically proven CTD were taken into the study and the subjects are totally evaluated with clinical history and all relevant investigations as per norms. **Results:** The mean age of study population was 55.43±11.99 years. Among the study population, 86.79% were females, 13.2% were males. Among the study population, 52.83% had Rheumatoid arthritis. 13.2% was contributed by Systemic Lupus Erythematosus. **Conclusion:** Pleuropulmonary manifestations of connective tissue disorders have a female preponderance. Dyspnea and cough are the most common symptoms noted. Majority of cases presented with Reticular pattern and GGOs on HRCT.

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INTRODUCTION

Connective tissue diseases contain a heterogenous group of autoimmune disorders characterized by presence of auto antibodies and autoimmune mediated organ damage. They include Rheumatoid arthritis (RA), Sjogrens, Systemic Lupus Erythematosus (SLE), Systemic sclerosis, Dermatomyositis/polymyositis, mixed connective tissue disease etc⁽¹⁾

Many CTDs involve the lungs directly or as a complication of treatment of CTDs. Several different components may be involved, including the airways, vessels, parenchyma, pleura, and respiratory muscle. Different CTDs have varied incidence and prevalence of each component of the respiratory tract.

ILDs are the most common pulmonary complications of CTDs. Interstitial Lung Disease (ILD) associated with CTDs may consist of several histological subtypes. CTD-related ILD have a better prognosis than idiopathic ILD. However, mortality is high in patients with CTDs who develop ILD and pulmonary hypertension.

The disease is characterized by deteriorating parenchymal fibrosis and gas exchange. It remains indolent in the early stage as most of rheumatic patients have restricted mobility manifesting with no or subtle pulmonary symptoms.

This study throws light on the pleuropulmonary manifestations on radiological and semi invasive procedures as most patients deny procedures like surgical or transbronchial lung biopsies.

It is better to opt an alternative procedure, hence the present study.

Aim of the Study

To study the pleuropulmonary manifestations in clinically and immunologically proven cases of Connective tissue disorders.

MATERIAL AND METHODS

The study was organized in Osmania Medical College / Hospital, Hyderabad, Telangana on 53 patients attending OP and Wards. The design of the work is a prevalence study. It extends from the period of April 2019 to October 2020.

Inclusion Criteria

Patient known case of clinically and immunologically proven CTD were taken into the study

Exclusion Criteria

- Heart disease, Diabetes mellitus, Cancer, Obesity, Acute respiratory infections, Smokers and HIV

METHODOLOGY

Patient with clinically and immunologically proven CTD were taken into the study. Patients were subjected to thorough detailed history and physical examination.

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Investigations

Hemogram, Sputum for Acid fast bacilli, Chest X ray, HRCT Chest, Spirometry, ECG, 2D ECHO, Fiber Optic Bronchoscopy.

Ethical Committee: Clearance obtained

Informed Consent: obtained from all patients included in the study

Statistical Analysis: done

Conflict of Interest: None

Pulmonary Function Test (PFT)

PFT was done evaluation and interpretations of the values were made by comparing with specific predicted or normal values taken from a healthy population. For all personnel FVC and FEV1/FVC were recorded.

Broncho Alveolar Lavage (BAL)

Bronchoalveolar lavage provides a safe and generally well tolerated means of retrieving secretions that co at the surface of bronchial and alveolar epithelium. Certain patterns of differential cell count correlate well with certain forms of ILD.

ECG & 2D ECHO Cardiogram: to know and assess underlying cardiac status.

OBSERVATIONS AND RESULTS

To study the pleuroparenchymal manifestations of patients with connective tissue disorders.

Table No 1- Showing the Age Distribution

Slno	Age group in years	Frequency	Percentage
1.	20-29 years	3	5.66%
2.	30-39 years	2	3.77%
3.	40-49 years	6	11.32%
4.	50-59 years	21	39.62%
5.	60-69 years	17	32.07%
6.	>70 years	4	7.54%
7.	Total	53	100%
8.	Mean± Standard Deviation	55.43±11.99	

Table No 2 Showing the Gender distribution among CTD

Slno	Gender distribution	Frequency	Percentage
1.	Female	46	86.79%
2.	Male	7	13.2%
3.	Total	53	100.00%

Table No 3 Showing the frequency of type of connective tissue disorder

Slno	Type of connective tissue disorder	Frequency	Percentage
1.	Rheumatoid arthritis	28	52.83%
2.	Systemic Lupus Erythamatosi	7	13.2%
3.	Systemic Sclerosis	7	13.2%
4.	Sjogrens	3	5.66%
5.	Others	3	5.66%
6.	PM	3	5.66%
7.	Mixed Connective tissue Disease	2	3.77%
8.	Total	53	100%

Table No 4 Showing symptoms in CTD

Slno	Sign/Symptoms	Frequency	Percentage
1.	Dyspnea	46	86.79%
2.	Cough	37	69.81%
3.	Fever	27	50.94%
4.	Hemoptysis	3	5.66%

Table No 5 Showing the complete blood picture findings among CTD

Slno	Complete blood picture findings	Frequency	Percentage
1.	Anemia	22	41.50%
2.	Leukocytosis	11	20.75%

Table No 6 Showing the sputum for AFB findings in CTD

Sl no	Sputum for AFB (acid fast bacilli)	Frequency	Percentage
1.	AFB present	4	7.54%
2.	AFB absent	49	92.45%
3.	Total	53	100.00%

Table No 7 Showing X-ray findings among CTD

Slno	X-ray findings	Frequency	Percentage
1.	Reticular	26	49.05%
2.	Nodular	11	20.75%
3.	Consolidation	11	20.75%
4.	Cardiomegaly	8	15.09%
5.	Pleural effusion	6	11.32%

Table No 8 Showing Spirometry findings

Slno	Spirometry findings	Frequency	Percentage
1.	Normal	26	49.05%
2.	Restrictive pattern	18	33.96%
3.	Mixed pattern	8	15.09%
4.	Obstructive pattern	1	1.88%
5.	Total	53	100.00%

Table No 9 showing HRCT findings

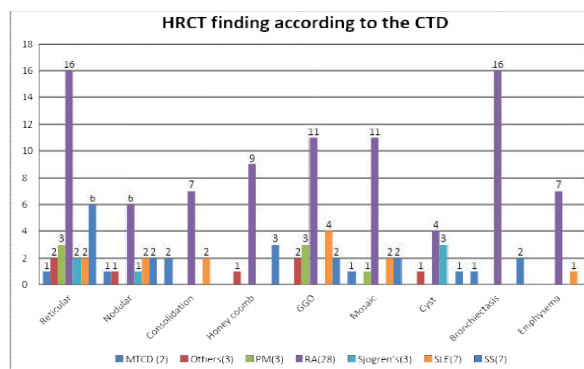
Slno	HRCT findings	Frequency	Percentage
1.	Reticular	32	60.37%
2.	Nodular	13	24.52%
3.	Consolidation	11	20.75%
4.	Honey combing	13	24.52%
5.	Ground glass opacity (GGO)	22	41.50%
6.	Mosaic	17	32.07%
7.	Cystic	9	16.98%
8.	Bronchiectasis	19	35.84%
9.	Emphysema	8	15.09%

Table No 10 Showing BAL findings

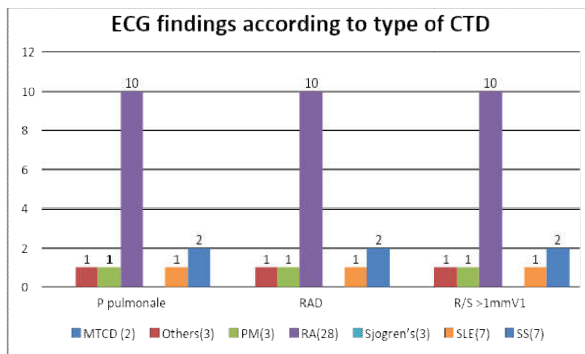
Slno	BAL findings	Frequency	Percentage
1.	Not Performed	29	54.71%
2.	Normal	4	7.54%
3.	Neutrophilic	10	18.86%
4.	Lymphocytic	8	15.09%
5.	Mixed	2	3.77%
6.	Total	53	100.00%

Table No 11 - Showing the Spirometry findings according to the type of connective tissue disorder:

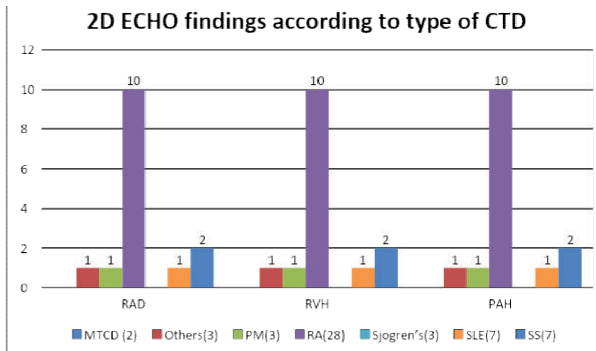
Sl no	Parameter	MTCD (2)	Others(3)	PM(3)	RA(28)	Sjogren's (3)	SLE SS (7)	SS(7)	Total
1.	Mixed	0	1	0	5	1	1	0	8
2.	Normal	1	1	1	13	2	5	3	26
3.	Obstructive	0	0	0	1	0	0	0	1
4.	Restrictive	1	1	2	9	0	0	4	18



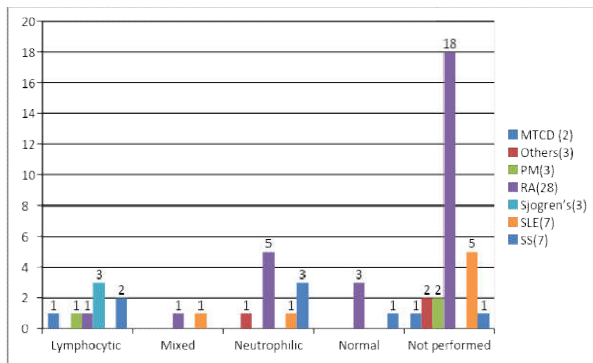
Graph No 1 showing the HRCT findings according to type of CTD



Graph No 2 Showing the ECG findings according to the type of connective tissue disorder



Graph No 3 Showing the 2D ECHO findings according to the type of connective tissue disorder



Graph No 4 Showing the BAL findings according to the type of connective tissue disorder

DISCUSSION

The present study was conducted at Government and General Chest Hospital to study the pleuroparenchymal manifestations of patients with connective tissue disorders.

Age distribution

The findings of the present study can be compared with the following studies:

Author	Findings
Present study	Around 40% belonged to the age group of 50-59 years, followed by 60-69 years (32.07%) and 40-49 years (11.32%). 7.54% belonged to age group of >70 years. 20-29 years and 30-39 years contributed to around 5% each. The mean age of study population was 55.43±11.99 years.
Galhotra, et al ⁽²⁾	Around 36% belonged to the age group of 61-70 years, followed by 51-60 years (25.71%) and 41-50 years (17.14%). 5.71% belonged to age group of 18-30 years, 31-40 years. 10% belonged to >7 years.
Verma et al ⁽³⁾	Majority CTD belonged to 50-60 years
Bilgici et al ⁽⁴⁾	Mean age of presentation was 53.6 years

Gender distribution

The findings of the present study can be compared with the following studies:

Author	Findings
Present study	86.79% were females, 13.2% were males.
Gaude et al ⁽⁵⁾	64% were females, 36% were males
Verma et al ⁽³⁾	71.9% were females, 28.1% were males

Connective tissue disorders

The findings of the present study can be compared with the following studies:

Author	Findings
Present study	52.83% had Rheumatoid arthritis. 13.2% was contributed by Systemic Lupus Erythematosus, Systemic Sclerosis each. 5.66% was contributed by Sjogrens, Others and PM. 3.77% was contributed by Mixed Connective Disorder.
Galhotra, et al ⁽²⁾	55.7% had Rheumatoid arthritis. 11.1% was contributed by Systemic Lupus Erythematosus, Systemic Sclerosis each. 7.4% was contributed by Sjogrens. Others contributed to 5.7%. 4.3% was contributed by Mixed Connective Disorder and polymyositis

Clinical features

The findings of the present study can be compared with the following studies:

Author	Findings
Present study	86.79% had dyspnea, 69.81% had cough. 50.94% complained of fever. 5.66% had hemoptysis.
Galhotra, et al ⁽²⁾	92.86% had dyspnea, 68.57% had cough. 55.71% complained of fever. 2.86% had hemoptysis

Complete blood picture findings: In the present study, 41.50% had anemia and 20.75% had leukocytosis.

Sputum for AFB: In the present study, AFB was present in 7.54% samples.

X - ray findings

In the present study, 49.05% had reticular pattern on X-ray. 20.75% each was contributed by nodular pattern and consolidation. 15% had cardiomegaly 11% had shown pleural effusion on chest X-rays.

Spirometry findings

In the present study, spirometry was normal among 49.05%. 33.96% exhibited restrictive pattern, 15.09% had mixed pattern and 1.88% had obstructive pattern.

HRCT findings

The findings of the present study can be compared with the following studies:

Author	Findings
Present study	60.37% had reticular pattern, 41.50% had Ground glass opacity (GGO), 35% had bronchiectasis and 32.07% had mosaic pattern on HRCT. Other findings were nodular pattern, honey combing (24.52%) each, consolidation (20.75%), cystic (16.98%) and emphysema in 15%.
Galhotra, et al ⁽²⁾	61.43% had reticular pattern, 40% had GGO, 48.57% had bronchiectasis and 32.86% had mosaic pattern on HRCT. Other findings were nodular pattern (21.43%), honey combing (24.29%) each, consolidation (14.29%), cystic (12.86%) and emphysema in 12.8%.

ECG findings

In the present study, 28.3% had P Pulmonale, Right axis deviation (RAD), R/S >1mmV1 on ECG.

2D ECHO findings

In the present study, 28.3% had Right ventricular hypertrophy (RVH), RAD, Pulmonary arterial hypertension (PAH) on 2d ECHO.

BAL findings

In the present study, BAL was not performed in 55%. 7.54% had normal findings, 18.86% had neutrophilic predominant pattern, 15.09% had lymphocytic predominant pattern. 3.77% had mixed pattern

Parenchymal changes according to CTD

Parenchymal changes	Galhotra, et al ⁽²⁾	Present study
Rheumatoid arthritis (RA)	Reticulations were the most common parenchymal abnormality in RA accounting for 68 percent of cases followed by GGO which was present in over 44 percent of cases ⁽⁶⁾ Mosaic attenuation was present in 36 percent of cases. Honeycombing was present in 31 percent of cases Nodules, consolidation, cysts were present in 20.5, 17.9, 15.4 percent of cases respectively ⁽⁷⁾	57.14% had reticulations, 39.28% had GGO, Mosaic pattern, 32.1% had honey combing, 25% had consolidation. 21.42% had nodular pattern and 14.2% had cystic lesions.
Systemic Lupus Erythmatosis (SLE)	GGO was the most common parenchymal abnormality present in SLE accounting for 50 percent of cases ⁽⁸⁾ Reticulations, mosaic attenuation, nodules and consolidation were present in 25 percent of cases each ⁽⁹⁾ Honeycombing and cyst formation were not seen. Mosaic attenuation was most common finding in sjogrens presenting in 60 percent of cases. Reticulations were present in 40 percent of cases. Nodules and cysts were present in 20 percent of cases each ⁽²⁾	GGO was the most common parenchymal abnormality present in SLE accounting for 57.14 percent of cases. 28.5% each was contributed by reticular, nodular, mosaic patterns and consolidation. Cystic lesions were present in all 100% of the cases. 66.66% had reticular pattern and 33.33% had nodular pattern.
Sjogren's Syndrome	Reticulations (87.5%) were most common finding in systemic sclerosis. Honeycombing was present in 50 percent of cases. Mosaic attenuation and nodules were found in 25 percent of cases each. GGO and cysts were found in 12.5 percent of cases each ⁽²⁾	85.71% had reticular pattern on HRCT.
Systemic sclerosis	Reticulations and GGO were present in all the cases with mosaic attenuation seen in one of the case ⁽¹⁰⁾	All the cases had GGO and reticular pattern on HRCT. 33.33% had mosaic pattern
Polymyositis	Out of the three cases reticulations and mosaic attenuation was found in one of the case. One of the case had consolidation and the other had nodules	Consolidation was seen in 100% of the cases, 50% of them also exhibited, nodular, reticular, mosaic Patterns
Mixed tissue connective disease (MTCDD)		

Airway changes according to CTD

Parenchymal changes	Galhotra, et al ⁽²⁾	Present study
Rheumatoid arthritis	Bronchiectasis was most common abnormality and was found in almost 67 percent of cases. Emphysema was found in 18 percent and GGN in 5 percent of cases ⁽¹¹⁾⁽¹²⁾	57.14% had bronchiectasis. Emphysema was found in 25%
Systemic Lupus	Emphysema was present in one of	Emphysema was

Erythmatosis	the case. No other airway abnormality was detected in patients of SLE.	present in 14.2% of the cases.
Sjogren's Syndrome	Bronchiectasis was seen in two cases. No other airway abnormality was detected.	No airway abnormality was detected in any case
Systemic sclerosis	Bronchiectasis was found in three cases. No other airway abnormality was detected.	28.5% had bronchiectasis
Polymyositis	No airway abnormality was detected.	No airway abnormality was detected.
MTCDD	Bronchiectasis was present in two cases.	50% of the cases had bronchiectasis
Others	One case was found to have bronchiectasis and one was found to have emphysema	No airway abnormality was detected.

HRCT Vs PFT

HRCT findings	Normal	PFT pattern Restrictive	Mixed	Total
Reticular	7	17(53.12%)	8	32
GGO	10	9(40.90%)	3	22
Total	17	26	11	

Reticular pattern of High resolution computerized tomography is compared with parameters of spirometry. Restrictive pattern is noted in both reticular and GGOs.

CONCLUSION

- Pleuropulmonary manifestations of connective tissue disorders have a female preponderance.
- Dyspnea and cough are the most common symptoms noted.
- Majority of cases presented with Reticular pattern and GGOs on HRCT.
- Both High resolution computerized tomography patterns (reticular & GGOs) have restrictive pattern on spirometry. It is noted more in reticular pattern than GGOs.

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